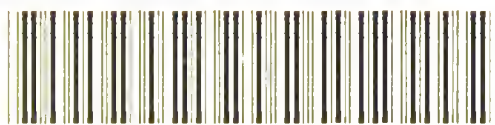


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PLATE I.



PORTIONS OF ONE SKELETON, FROM A BURIAL-MOUND IN COLORADO.

(From the Peabody Museum of American Archaeology and Ethnology, Cambridge, Mass. Kindness of Prof. F. W. Putnam.)



A SYSTEM OF

GENITO-URINARY DISEASES

· SYPHILOLOGY AND DERMATOLOGY.

BY VARIOUS AUTHORS.

EDITED BY

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IN THE UNIVERSITY OF THE CITY OF NEW YORK; SURGEON TO CHARITY HOSPITAL.

VOL. II.—PART I.

SYPHILOLOGY.

WITH NUMEROUS ILLUSTRATIONS.

EDINBURGH & LONDON:
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P R E F A C E .

THE general plan and scope of this "System" have been fully set forth in the preface to the first volume.

In the preparation of Volume II it has been the aim of the editor, with the assistance of a corps of contributors of acknowledged eminence in their respective specialties, to produce a complete and systematic treatise on "Syphilis and Chaneroid" which should be thoroughly up to date, embodying the most recent advances made in our knowledge of these diseases, and at the same time essentially practical.

With this object in view, many theoretical questions and unimportant details which occupy a prominent place in general treatises on these subjects, but which now possess only a historical interest, have been omitted, or dismissed with but brief mention—such, for example, as the Unity or Duality of the Syphilitic Virus, Syphilization, Formularies of Discarded Drugs, Obsolete Methods of Treatment, etc. The endeavor has been to present only the essential facts of our knowledge, and to discuss questions of live, practical interest.

The volume has been enriched by a careful gleanings of all that is most valuable in the numerous contributions made to the literature of syphilis within recent years, and its presentation in a compact and available form.

Modern bacteriological researches have given us a clearer conception of the important *rôle* played by micro-organisms in the production of syphilitic phenomena. While the theory of the bacterial origin of syphilis rests upon hypothesis rather than absolute demonstration, yet the general recognition of a specific microbe as the essential etiological factor, of the action of its toxins upon the tissues, and of the pathogenetic influence of pyogenic microbes, has thrown a flood of light upon the interpretation of many of the morbid processes of syphilis. Recent investigations into the pathology of syphilis have materially enlarged our knowledge of the vast complexus of its pathological relationships. The

relations of syphilis to tuberculosis, to rachitis, to tabes, and to many obscure diseases of the nervous system, have received full consideration in the present volume.

The important subject of the relations of syphilis to public health, its socio-economic aspects and the practical working of the legislative measures employed in various countries for the repression of the social evil, have been intelligently and forcibly presented, with the author's conclusions as to the most available methods of limiting the spread of syphilis.

With the view of meeting the wants of the general practitioner, the subjects of diagnosis and treatment have received more consideration than is usually allotted to them in works of this class. In addition to the general chapters on diagnosis, prognosis, and treatment, these subjects have been considered in connection with the manifestations of syphilis in different organs from the independent standpoint of the individual contributor. In this way are conveyed many valuable suggestions and practical points in diagnosis which admirably supplement the more general exposition of the subject, while the side lights thrown upon the management of special complications by so many skilled specialists can not fail to present the whole subject of treatment in a clearer and more practical light.

The illustrations which accompany the different articles are for the most part original, and, where not otherwise credited, have been furnished by the authors. The publishers have spared no expense in having them executed in the best possible manner. The newest and most improved methods known to modern art have been employed in their reproduction. In addition to the typogravure, half-tone, and chromolithographic plates, two new processes have been employed. Plate II is reproduced by the typogravure process in colors, which was discovered by Vogel, of Berlin, and developed by Kurtz, of New York. The result is obtained by photographing the three primary colors from which the three color plates are made, thus assuring photographic accuracy in the representation of the subject.

Plates III, IV, VI, and XII are reproduced by photography and lithography combined. This is the first time that this process has been applied to medical subjects; and the publishers call attention to these plates as being something unique.

NEW YORK. *June, 1893.*

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HISTORY, GEOGRAPHICAL DISTRIBUTION, EVOLUTION, AND GENERAL PATHOLOGICAL ANATOMY OF SYPHILIS.

By JAMES NEVINS HYDE, M. D.

Definition.—**Syphilis.**—Synonyms: Lues venerea; morbus gallicus; pox; bad disorder; Fr., *vérole*; Ital., *sifilide*; Ger., *Lustseuche*; *Krankheit der Franzosen*; Span., *sifilis*; Swed., *radezyge*.

Syphilis is a general infectious disorder, both acquired and transmissible by inheritance, chronic in course, and displaying in a determinate order specific symptoms which may be declared in one organ of the body or simultaneously or successively in several. It is to be classed with the infectious granulomata, being due to the toxic effect of the invasion of the tissues of the body by micro-organisms whose identity and relations have not yet been established as in other affections of the same class, such as tuberculosis, lepra, and mycosis fungoides.

The name by which the disease is most often recognized in all languages was first employed by Hieronymus Fracastorius, who in the year 1521 composed a poem in which a herdsman named Syphilus was afflicted with some mysterious malady by the god Apollo, for giving divine honors to the king. The derivation of the word from the Greek *σῦς* and *φίλος* was evidently intended by the author to suggest, in no reproachful sense, that the hero of his verse was a simple companion of swine.

HISTORY.

The existence of syphilis in prehistoric ages has been inferred after close study of certain bones exhumed in various parts of the earth, and which exhibit lesions identical with or similar to those recognized in bones where there is no question as to the syphilitic nature of the process. Thus in Solutré, of the department of Saône et Loire, in Peru, Ecuador, Tennessee, Colorado, California, Lima, and other places, bones have been exhumed exhibiting exostoses, and the results of periostitis, osteitis, sclerosis, caries, and other morbid processes. These lesions have been interpreted by Parrot and others as unequivocally due to syphilis; and from proofs of this character the prehistoric existence of the disease has been considered established.

Other views, however, have been taken of this subject, and that by those who have studied with special attention bones exhumed from places supposed to have been the site of prehistoric sepulture, where osseous lesions of the kind named above were both numerous and in a high de-



FIG. 1.—Tibiae of a skeleton exhumed from a prehistoric burial-site on the Animas River, Colorado.
(From a photograph of bones in the author's collection.)

gree deforming. Rigidly careful exclusion from these of the nodules to be recognized in bones certainly syphilitic, exhibiting laminated or eburnated, smooth or flattish, and distinctly circumscribed swellings; the

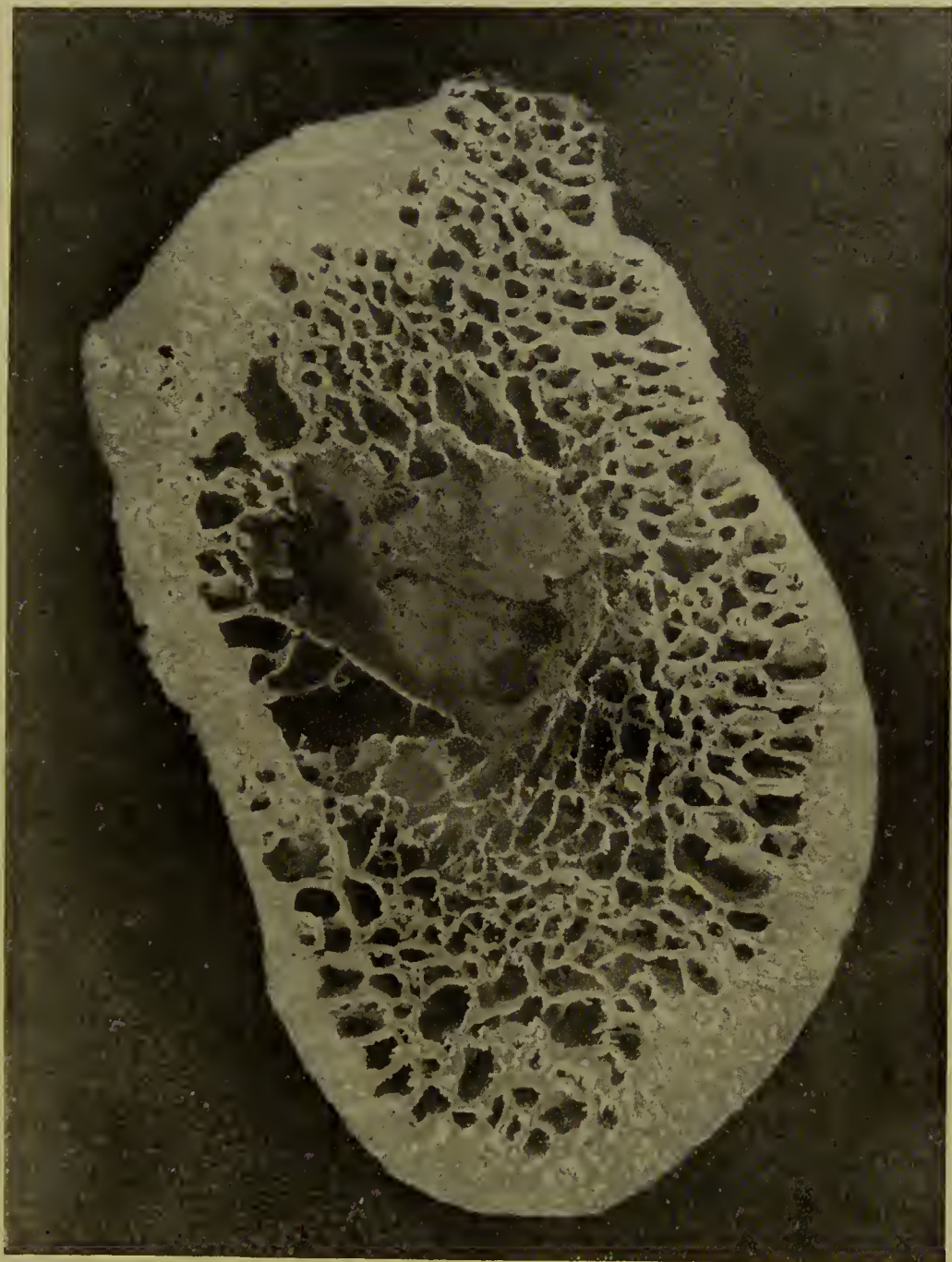


FIG. 2.—Section of tibia exhumed from a prehistoric burial-site in Colorado. (The author's collection.)

noticeable absence in them of certain characteristic annular swellings at one extremity of several long bones such as the radius; and the absence of bone cicatrices, "splints," unmistakable diffuse or circumscribed gummatous changes; and even of a thoroughly characteristic "worm-eaten"

structure, suggested grave doubt. Should not the bones of a prehistoric race, where no efficient treatment interposed a barrier against the encroachments of the disease, exhibit in an intense degree, if such a disease had prevailed when that race yet survived, the osseous lesions of syphilis? It is almost true that the reverse is the rule. Would not a race of men in the latter part of the Pleistocene period, in their rude efforts to survive and overcome the perils of climate and of enemies, be subjected to influences that might determine in them osseous inflammation of exposed bones with results that resembled to-day those of other diseases? To establish a denial to these questions would be difficult. Section of some of these bones, and a careful study of the microscopical characters thus made evident, suggest that the changes induced might have been caused by simple inflammation. In one such bone examined for the author by Dr. Prudden, of New York, the result was by no means indicative of a specific process. The section examined was of a left tibia of very great age, exceedingly light in weight, with characteristic anterior curve, and great increase in thickness (Fig. 2). It had been sent to the author from Colorado, where it had been exhumed from a burial-place pronounced by several experts to be a prehistoric site. But here were found merely irregularity of grouping of the bone-cells and lamellæ, some eroded depressions, and lacunæ indicating formation and absorption of bone under the influence of a chronic periostitis. There was no morphological evidence sufficient to justify the belief that the individual had been the victim of syphilis; and yet, without any question whatever, this bone was an unusually good example of the class whose conspicuous deformities have induced a number of distinguished writers to assert that syphilis had a prehistoric origin.

Again, the exhumation of bones found in places of undoubtedly ancient sepulture is far from demonstrating a prehistoric existence for such osseous relics. The enormous possibilities of error in the effort to establish a prehistoric existence of the mortuary remains of an animal are to be fully weighed in connection with the possibilities of what is termed intrusive interment, the latter occurring at a much later period than that assigned for the first acts of sepulture in any given cave, or mound, or cliff-side. Even the discovery of bones beneath strata of rock and alluvium demonstrably of a period near the Pleistocene, has been shown to be explicable by the shifting of soil and the accidents of natural convulsion occurring at later dates. The conditions of a rigid demonstration of the prehistoric existence of a skeleton or any part of one supposed to be syphilitic, are in fact scarcely to be fulfilled in any one case. The entire question requires not merely a satisfactory proof of the prehistoric existence of the bone and of a prehistoric sepulture, but also proof of non-violation of the resting-place later by intrusive interment, and also wholly

satisfactory demonstration of a syphilitic agency in the osseous changes. The problem to be solved also demands absolutely the discovery of bones indicating inherited syphilis. Many bones of children supposed to be historic are to be found in American collections with unquestioned changes due to osteitis and periostitis, but none, so far as known to the writer, can be with positiveness assigned to the category of bones changed by inherited lues. *Per contra*, it should be added, that there are several skulls of children in the Anthropological Institute of France supposed to be prehistoric, in which Parrot, Broca, and other French writers positively assert that the changes produced are the result of inherited syphilis; other bones of the skeleton, both in the museum named and in others in France, exhibit lesions interpreted as luetic by careful observers qualified to give judgment. Unfortunately for the student of this subject who must review the literature of foreign authors, most contributions to this theme made by physicians are arguments on the one side or the other of the syphilitic or nonsyphilitic character of symptoms in bones of "great antiquity," the proof of a prehistoric existence of such bones being ignored in well-nigh every case. Thus, in his admirable chapter devoted to this subject, Jullien writes of the famous Ducrot skeleton that it belonged "in great probability to the epoch of primitive man"; while Buret scarcely takes the pains to set forth, in his exhaustive discussion of the same theme, the stern necessity of establishing for every bone having the appearance of syphilitic changes and also of great antiquity, its prehistoric age as conditioned upon its essential characters, the antiquity of its burial site, and the proof of nonintrusion. The whole should be irrefragable.

Considering the disease as it has prevailed within historic periods, a serious doubt has arisen respecting its existence and recognition prior to the close of the fifteenth century, a crisis in the career of syphilis to which attention is directed later in these pages. This doubt has been suggested by the fact that the several disorders of venereal origin now recognized as essentially distinct each from the other, were inextricably confused till within a relatively recent date. Even so modern a writer, for example, as John Hunter, in the year 1786, was not clear in distinguishing between the gonorrhœal and syphilitic virus. Had this simple distinction been indeed established, the no less important separation of the contagious, venereal, nonsyphilitic, pustulo-ulcerative lesion (chancre, non-infecting, soft, or simple chancre; *chancre mou*, *chancrelle*; Einfacher Schanker, weiche Schanker, etc.) from both the initial sclerosis and later genital lesions of systemic syphilis, was far from complete at the beginning of the present century. Of comparatively recent acquisition, too, is a knowledge of the fact, now well recognized, that in persons addicted to promiscuous sexual relations, venereal warts, not of necessity

due either to syphilitic or blennorrhagic antecedents, may be confounded with symptoms of those diseases.

This confusion in a field where careful clinical observation is now daily discriminating with results of enormous value, is to be coupled with an important fact. The utmost looseness has prevailed in the use of terms as applied to lesions of the genital organs of both sexes, not merely by the writers of antiquity on medical subjects, but also by secular historians and poets of a similar age, whether contributing to serious, licentious, or sarcastic literature. In point of fact, as employed by the fathers of medicine, the names which still survive in the modern nomenclature of diseases in general rarely possess to-day the precise significance of their earlier usage. Lastly, it is to be remembered that for many of the scanty facts gleaned from documents dating more than one thousand years before the Christian era, medicine is indebted to translations of the written tongues of Asiatic peoples no longer employed as vernacular, the translators in most cases being men learned in other fields than in the science of medicine.

This much it is needful to premise in order to be able to accept or reject with due caution, on the one hand, the specious pleadings by which numerous authors have demonstrated to their own satisfaction that syphilis in every one of its recognized manifestations was well known to the ancients; and the claim, on the other hand, enforced by writers of no less erudition, that the disease was first made known after the discovery of the New World.

In the ancient literature of the Chinese and Japanese, according to Buret and other French writers who have expended great labor in the investigation, not only were the initial lesion of the disease, its cutaneous, osseous, and visceral manifestations, understood and appreciated, but by the Chinese at least the value of mercury as a therapeutic agent was fully recognized. Paragraphs are quoted from a Chinese treatise entitled *Hoang-ty-mi-king*, in which laryngeal symptoms, osteocopic pains, and condylomata, are described with such minuteness as to lead to a suspicion of the genuineness of the text. In certain Japanese manuscripts, to which a much less remote date is assigned, there are similar references, with phrases, indicating that at the time of its writing the destructive action of syphilis upon the nose, the ears, and the joints was fully recognized.

Similarly it is claimed that certain of the Egyptian papyri and cuneiform inscriptions from Assyria and Babylon, found in the collections of scientific societies, indicate clearly that, by the people living at the time these records were made, some relation was established between local genital disease resulting from sexual indulgence and lesions observed later upon the trunk, the limbs, and the organs of sense.

In the records and traditions of the Hebrews, embodied for the most

part in their sacred writings, a field is presented where the ripest scholarship and the most painstaking study have put forth their finest effort. Here the most earnest attempts have been made to demonstrate the existence of syphilis among the descendants of Abraham; and of these efforts it may be said that if the proofs of the existence of syphilis among the Chinese and Babylonians have no better basis than those adduced for the dwellers in Judea, the end in view is far from attainment.

There is strong reason to believe that reference is made to gonorrhœa in the regulations prescribed by the Levitical law; but that syphilis is to be recognized in the vague phrases adduced in proof of its existence among the Hebrews, involves a looseness of conjecture which would be fatal to the accuracy of a modern diagnostician. Neither in their sacred writings nor in the commentary of Josephus, nor in the Talmudical books, are there unequivocal sentences bearing on this point. In the interpretation, moreover, of the passages cited as a basis of the claim put forth, it should not be forgotten that in these poetical and prophetic books the language employed is that of an Oriental people, often figurative in the extreme, or the passionate phrases of varying emotions not to be measured by the cold terms of scientific inquiry. Thus, the strong expressions in which David, after the loss of his child by Bath-sheba, bewails the disease of his bones, the loss of his strength, and the leaving of his tongue to his palate, have been urged in proof of a syphilis derived from the woman and the cause by inheritance of the premature death of the child; but those who have most strenuously enlarged upon this theme have neglected to explain how this union resulted later in the birth of four sturdy sons in the royal palace, the eldest of whom, Solomon, proved to be one of the greatest of the royal line of Judah.

Examined with a cautious exclusion of vague expressions, one turns with the same result to the passages from the ancient records of India, known as the Vedas, which are cited in proof of the existence of syphilis among the people who first listened to these historical and religious poems and precepts. It is to be remembered that they, equally with the dwellers in the land of Judea, were for climatic and geographical reasons made only too familiar with a series of disorders whose manifestations, in the hyperbole of the Orient, could readily be interpreted by modern investigators as descriptive of syphilitic symptoms. Thus they were in unquestioned contact with lepra, and were peculiarly subject to the ophthalmias and other ocular diseases so common in the East. There is reason to believe that they were afflicted with psoriasis, scabies, and tubercles. They evidently suffered from hæmorrhoids, fissures of the anus, and vegetations due to the bathing of the genital parts in venereal secretions. The eczemas of a modern date are probably identical with some of the pruritic affections described as originating in the sexual act. That the

language used does not certainly apply to the manifestations of syphilis, is evident from the fact that the symptoms described are in some cases referred to the sexual act after long continence, and even to sexual excesses pure and simple.

Passing in review the several nations of antiquity who have a historical literature, one can distinguish in each traces of venereal disease with symptoms described that might be those of syphilis, and yet might, as has been already shown, be referred to nonsyphilitic venereal manifestations. Among the Greeks, the license of whose manners and laws permitted the largest opportunities for the spread of sexual maladies, there is wanting any specific description of a causal relation between genital lesions and constitutional troubles. Among them, as among the ancient Romans, the literature of ancient medicine abounds with descriptive references to "growths" (*φύματα*), fig-like (*σῦκα*), warty excrescences, fungous elevations, and ulcers; but the sclerosis of primary specific disease is not represented by any term that survives. It is indeed a noteworthy fact, that while in the nomenclature of modern pathology a surprisingly large list survives of names many of which with a modified application still relate to morbid appearances at least cognate with those originally pointed out by such terms, there is scarcely one left to the pages of syphilography. Thus, "anthrax," "carbuncle," "pterygium," "keloid," "mellitagra," and other names, still point with more or less clearness to the affections they first designated, while the term "chancre" itself is a corruption of a word originally employed to designate a totally different lesion.

Divorce among the ancient Greeks was regulated by special provision of law; and though it is to be admitted that these separations were not frequent, it is certain that they were at times the result of trivial pretexts. Thus we find husbands separated from wives because the children resulting from the union were all of one sex, or too numerous, or wholly absent. Divorce for infidelity was also possible, though the law gave a power to the husband finding a wife in the adulterous act which made recourse to the courts scarcely needful. But it is a very striking fact that there is no provision in the Athenian laws for divorce on the ground of contracting a venereal disease; and the same is true of Sparta.

On the other hand, passages are cited from the writings of Thueydides, Erasistratus, Dion Chrysostom, and others, in which it appears that a raucous voice, a flattened nose, ulcerations of the legs, and lesions of other parts of the body, such as the hands and feet, were recognized as the results of venereal contagion, whether in the sexual act or in the unnatural practices, which have left a sinister bar of black across the historical page of almost every nation worshiping false gods before the Christian era.

The literature of ancient Rome, whether of serious or sarcastic intent, conveys neither more nor less proof of the existence of syphilis at that period than does that of Greece. There are abundant proofs of the existence of venereal disease. Here, too, the fig-like vegetations (*figus*), the fungous growths, and genital excrescences, are often mentioned. In the pages of other authors exist references to symptoms apparently due to systemic disorder which seem to indicate that the constitutional effects of disease incurred in the practices of debauchery were not unknown. Such are the phrases referring to cutaneous blotches, lesions of the mouth, tumors of the legs, and discolorations of the eyes and orbital regions, all of which, as shown before, might be explained by the existence among them of scabics, eethyma, psoriasis, and other affections of the skin.

In the middle ages, the traces, if any exist, of a syphilis before the close of the fifteenth century are, like those preceding, vague. From Lanfranc, of Milan, to Peter Martyr there appear, in the pages of medicine and history isolated sentences which describe syphilis not more clearly and not less distinctly than the records of an earlier epoch. Thus we find lucidly indicated genital sores followed by sloughing, originally resulting from contagion. In an oft-quoted sentence from the pages of the Glossulæ Geraudi, whose date is uncertain, it is distinctly stated that the "whole body" may be infected as the result of lesions of the male organ infected from the humors of the foul uterus. On the other hand, Lancereaux points to the evidences in the pages of Gordon, Schoff, Michael Scotus, and others, that syphilis (or the disease supposed to-day to have been identical with it) was confused with lepra by both lay and medical authors.

Reviewing the entire subject of the history of syphilis from the earliest records to the close of the fifteenth century, one is not justified in considering its existence at that period verified and the chain of its consecutive phenomena even partially established. There are enormous opportunities for error on the part of those who have championed either side of the question. Vague terms have been given a meaning unquestionably not originally included in their sense; others have been actually twisted from the designation of one symptom to that of another.

On the other hand, the mass of testimony is sufficient in itself to bear some weight. Local venereal disease of contagious character and formidable symptoms was known. It appears that, in a general way, systemic consequences of debauchery were also recognized. If syphilis then actually existed, it is probable that it had not yet attained among men the virulence and formidable features of a later date. If it actually did exist, the idea of its unity in both local and general expressions had not been grasped; and assuredly had not been exactly differentiated from several other affections.

In the year 1492 the admiral Cristoval Colon, better known to Americans as Christopher Columbus, sailed across the Atlantic and discovered some of the outlying islands of the Western hemisphere. On the 4th of January, 1493, he sailed from the West Indies on his return to Spain, which was reached by the following March. Ruy Diaz de Isla, a physician of Andalusia, stated that he treated some of this company for syphilis, the symptoms of which first appeared on shipboard before their landing. On the 14th of June of the year following, Nicholas Seyllatius reported an epidemic of syphilis. Soon after this the Great Captain, Gonzalez Fernandez de Cordova, left Spain for Italy, where in a second campaign his troops were brought into contact with those of the French.

The French troops were those of the monarch Charles VIII, who in an expedition against Naples led an army of between eight and ten thousand men into the plains of Italy, crossing into Piedmont on the 8th of December, 1494. This army was officered by men of aristocratic connections leading the loosest of lives. The rank and file, following the example of their dissolute commanders, were successively quartered in most of the larger Italian cities, and in the license of unrestraint did not hesitate even to pillage Rome.

For the first time in the history of the world syphilis was now revealed in completeness to the study of medical men. An unmistakable epidemic of the disease at once spread with greater or less rapidity over France, Spain, Italy, Switzerland, and the Rhine provinces, thence extending to other parts of Europe. Its phenomena were now carefully explored, and its primary lesions connected distinctly with its systemic manifestations. It was given names in almost every land that pointed to that nation from which each supposed that it had been derived. Oviedo stated that the disease had been brought from the West Indies by the fleet of Columbus, and added that he was personally acquainted with some of the navigators, giving their names, who had been infected by the natives of the New World. He further reported that infected persons were known to have traveled into Italy with the army of Cordova. Syphilis went accordingly by the name of "the American disease," "the French disease" (*morbus gallicus*), "the Italian disease," "the malady of the Neapolitans," "of the Christians," "of the Turks," "of the Portuguese," "of the Germans," "of the Persians," "of the Poles." In almost every tongue of Europe, however, there is some title of antiquity which would fasten the origin of the disease upon the French.

Two views are taken of the apparent origin of this disorder first called by its legion of new names at the close of the fifteenth century. One explains the first epidemic of Europe by an absolutely American origin, a deportation of the germ from the West Indies after the Columbian discoveries, and an extension thereafter in consequence of the facili-

ties afforded by the commingling of nations in the campaigns of the military leaders already described. The other, basing conclusions upon the traces of its existence in the preceding centuries of history, which have been already reviewed in these pages, takes the ground that the epidemic succeeding the Columbian discovery, was merely an awakening to activity of the germs of a disease which had been up to that date unnoticed because of its limitations.

Here, too, an absolute conclusion can not be reached. The evidences of a prehistoric syphilis in America, though fortified by the researches of the eminent Prof. Joseph Jones, of Louisiana, Dr. Gustavus Bruehl, of Ohio, and others, can not be accepted without reserve. The objections to many of the osseous specimens to be found in American collections of bones have been recounted in connection with the general subject, and hold good for all relics taken from places of presumed prehistoric sepulture. The historic evidences of syphilis among the crowded islands of the newly discovered hemisphere are as significant and authentic as the proofs of the same disease among the Egyptians, the Chinese, and the Greeks. The writings of Sahagun, Torquemada, Roman, Mendicta, Pane, and others, show that the bodies of the Indians dead of syphilis were interred as distinguished from those dying of other disorders, which were cremated; that the infected were not deemed worthy of religious sacrifices; that they were not represented at the festivals; and that the disease itself was counted as a punishment sent from the gods for the non-performance of religious rites, and other offenses. According to Bruehl, the Mexicans not only recognized the relation between the primary and consecutive manifestations of the malady, but distinguished between its several types, and were so well acquainted with its management that they taught the Spaniards how to treat it, even advising recourse to thermal resorts for the purpose. While there were seventeen Indian dialects, each of which had a primitive native term for the designation of the disease, none of these seems to have crossed the ocean to relieve the French of the odium of begetting a shameful disorder to which their name had been given by the consent of all Europe. None of these Indian names, however, was, when examined by experts in their language, found to betray in the least, evidences of a recent coining; though many such terms were required and actually coined after coming into contact with the Spanish race on their native soil. In the Mexican language of the sixteenth century there is a remarkable confusion of the several words employed to express power, divinity, and syphilis—a fact which is also to be noted in the dialects of Quechua and Aymerás, three hundred years before Pizarro conquered the capital of the Incas. Certainly, whether the syphilis of Europe had or had not an American origin, the proofs of its existence among the natives of the New World before the first voyage of

Columbus are as strong as any derived from a study of the papyri of Egypt or the famous documents which Captain Dabry brought to light from the heart of Asia.

The history of syphilis, from the beginning of the sixteenth century to the present date, is comparable with that of the advance in the same period of all science. Obscured at times by reason of its confusion with astrology and the arts of charlatanism, the evolution and symptoms of the disease were soon studied by Paracelsus (1536), and later by Della Croce and Ambroise Paré. Astruc and Van Swieten, in the early part of the eighteenth century, systematized the employment of mercury in the management of the disease; and were followed by the distinguished Boerhaave, who in his immortal Aphorisms gave to the world the fruits of his patient study and keen analysis of the several pictures presented in the course of the disorder.

Toward the close of the same century, John Hunter and Benjamin Bell, both Englishmen, contributed by original investigation to a further knowledge of the same theme. Gradually the truth dawned that blennorrhagic affections were to be eliminated from the lesions of syphilis, and that a man with a purulent urethral discharge might have a syphilitic sore, intra-urethral in site, which might render the secretion of his apparently simple gonorrhœa a vehicle for the transmission of a more serious virus. Hunter's name still lingers upon the lips of the practitioners of a former generation, in the phrase "Hunterian chancre," applied to a clinical form of the initial sclerosis large of induration with a centrally situated crateriform excavation.

With the nineteenth century began the rapid acquisition of knowledge on the subject of syphilis, whose results to-day furnish a mass of literature of incredible bulk, and a list of investigators and authors whose eminence has contributed luster to the records of medicine in every nation.

The French were, without question, earliest to win a name in this fruitful field. Jourdan and Desruelles were merely the *avant couriers* of the eminent Ricord, whose obsequies were happily not celebrated till after the International Congress of Dermatology and Syphilography of 1889 had greeted with acclamations the form of the great teacher by the side of its honored president. He it was who first comprehended, and later taught in a masterly manner, the distinctions of three great periods in the disease—the so-called primary, secondary, and tertiary—phrases now recognized as convenient forms of expression, but marking, at the time when they were first given to the scientific world, an epoch of transition in the knowledge of the phenomena of syphilis. They will survive on the lips of the laity for many years to come, as historical evidences of the value of careful observation of all morbid phe-

nomena. To his worthy successor, Bassereau, is due the credit of initiating the movement which at one time completely separated, in the minds of advanced students, the simple noninfecting from the syphilitic chancre, his work being speedily followed by that of Rollet, whose explanation of the "mixed" chancre relieved many doubtful cases of the burden of a danger equally great to both patient and physician.

Then follows a long list of names in France, Germany, and England, whose numerous works can scarcely receive mention in the limits of a chapter like the present. Lancereaux, Diday, Mauriac, Parrot, Jullien, and Mireur have in our day made contributions in France that were fitly crowned with the great work of Fournier, who to-day represents among his colleagues the fine fruit of more than a quarter of a century of patient observation and study of the effects of the disease. His contributions to the special subjects of nervous and inherited syphilis would alone serve as a basis for his claims to eminence. In Italy, Profeta, Pellizari, and Gamberini; in Germany, Virehow, Heubner, Erb, Oppolzer, Auspitz, and more recently Kaposi, have been in England represented by Lane, Hinglins Jackson, and Jonathan Hutchinson, by Haslund in Denmark, and by Boeck in Sweden.

In the United States of America the first author to command the general attention of the profession was Freeman J. Bunstead, whose work on *The Pathology and Treatment of Venereal Diseases*, published in Philadelphia in 1859, was the noteworthy predecessor of a list of contributions to the subject by American writers, the value of whose observations have not been surpassed in any country, and are now recognized in all. Among those who have followed him may be named Taylor, Keyes, Morrow, and Sturgis, of New York; Greenough and Post, of Boston; J. William White, of Philadelphia; and many of the dermatologists of this country, such as Dühring, Robinson, Piffard, and others, who, describing chiefly the cutaneous lesions of the disease, have devoted chapters in their treatises to the consideration of this special part of syphilography. In most of the medical schools of this country to-day the subject is taught with a clearness and illustrated with a fullness never before made available to the American student of medicine. By the aid of the several atlases of American authorship, notably those of Taylor and Morrow in chromolithographs, and of George Henry Fox in photographs, the illustration on paper of the ravages of the disease has been accessible to the practitioner, outside of the amphitheatre of the medical college. Of the pathological work done by Lustgarten, of New York, and others, the reader has an opportunity of judging in the pages which follow.

GEOGRAPHICAL DISTRIBUTION OF SYPHILIS.

The interest once centered in the questions relating to the geographical distribution of syphilis has been practically set aside by the wider knowledge had to-day respecting the different phenomena of the disease, and the advancement of international communication in the lines of the extension of commerce by steam power on sea and land. The preliminary cycles of the disease are relatively rapid of completion, and yet the infected individual can compass the globe between the date of his accident and the onset of general symptoms; and, when suffering from the latter in a contagious form, can make the same wide circuit before such contagious lesions are made to disappear. It follows that in this latter part of the nineteenth century there is no corner of any civilized country where the disease may not be encountered; and if there be any uncivilized people as yet relatively free from its influences, it is largely because that people have not been in intimate commercial relations with the world at large. Directly on the establishment of such relations, even in the remoter districts of the globe, syphilis is wont to appear, and for a time to spread with unusual severity.

For countries such as Iceland, and for certain islands in the Gulf of St. Lawrence, it is claimed there is special immunity against the disease, since in these and other places after its introduction it scarcely survives a second generation. This fact, supported by the statements of several observers, is readily explicable because of the simple lives and moral behavior of the people gathered in these rustic communities. That there is nothing at all surprising in these statistics, is daily demonstrated in the experience of many of the smaller towns and villages of this country, where, though syphilis has been at one time or another actually introduced, practitioners can report that they are not in these places confronted with a single case of the disease in the course of years of observation. No one to-day attributes this immunity to the conditions of either climate or soil. It is an immunity due to the simple fact that the infected, after communicating the disease to a few persons, have been treated, have lost the power of further transmission, and having meanwhile been harbored in a community whose general moral standard forbade the possibilities of a further spread of the disease, the latter has naturally died out.

Of other countries in which it has been claimed that the disease either appears in a new or strange dress, unfamiliar to those who recognize it elsewhere and called also by a different name, it is sufficient to say that the confusion has affected only the minds of the observers who have reported as to the facts. The "radezyge" of Norway resembles in its history that of the "Norwegian itch," which was demonstrated by the

microscope to be but the seabies of Europe with a new name, occurring in an exaggerated type. In the north of Europe, as elsewhere, the "spedalsked," or leprosy, has been confounded with syphilis, a fact to which interest is lent by the significant history of lepra in the Sandwich Islands, where the ravages of the last-named disorder have long been confounded with those of syphilis—a confusion which to this day, though to a more limited extent than formerly, still prevails. Indeed, of almost any land little known save to the active members of the Royal Geographical Society, where strange forms of a disease like syphilis are reported, it may be suspected that the malady exists there in manifestations unfamiliar only to practitioners of a narrow experience and provincial methods. The modern expert of our large cities, who reads the several pictures of syphilis as readily as the pages of an open book may be perused, has no difficulty in deciphering the phenomena which are a riddle to the conscientious practitioner of more limited range.

The words "endemic" and "epidemic" as applied to the disease are manifestly erroneous, and should be dropped from the pages of the syphilographer. Syphilis is never in its progress related to conditions of soil, water, or climate, and is never propagated in a wholesale manner so that entire communities are involved in its course. The most that can be observed in the so-called "epidemics" of the malady are a few groups of patients where the infection spreads from individual to individual among families ignorant of the source of the trouble. Occasionally (and in the light of modern science very rarely indeed) a professional circumciser with mucous patches in his mouth, a glass-blower, a tattooer, or a public vaccinator, similarly affected, will spread the disease among a dozen or more persons, its progress being at once checked on the recognition of the cause, which as a rule speedily follows.

The propagation of syphilitic disease respects, indeed, neither national boundaries, geographical divisions, nor the isothermal lines drawn across earth and sea. The disease is one whose increment is by populations, and whose lessons are well studied in the statistics of the census, the registries of the shipping lists, and the acquisitions of trade and commerce. It is, as distinguished from many other affections, not exclusively a malady of the filthy, nor an appanage of the poor, nor only a burden of the wretched, though all these endure its scourges. It is a plague which chiefly spreads where men are most closely aggregated either for temporary purposes or for permanent residence. It is thus most extensively seen in large capitals, in densely populated cities, in the towns where great fairs are held, such as those of Nijni-Novgorod, of Paris, of Vienna, and of London; where great armies are collected in the vicinity of cities; where trade actively springs up between two populous and distant centers. It is a disease chiefly of the second and third decades of life in the two

sexes, and occurs therefore in that age of the individual when the activities of the body are greatest as respects travel and intercourse with the world, and also when the restraints of very early and middle life have not yet, for most persons, become appreciated as effective. It is, lastly, a disease largely spread by promiscuous indulgence of the sexual instinct, and is therefore most often communicated in the period of youth, when that instinct acknowledges the keenest appetite. Geographically, therefore, syphilis is to be sought in that community where the population is large, where it is actively engaged in trade with other populous communities, and where the men and women of an early age are not disciplined by the usages of an older society whose moral code is enforced by public sentiment, as, for example, among the people of frontier towns coming into sudden and intimate relations with an inferior class of foreigners.

Among European countries, syphilis accordingly is found to prevail extensively in Russia, especially in the large cities of Moscow and St. Petersburg; as also in Jutland, Norway, Sweden, Poland, and Denmark. The colder climates, where one might suppose on *a priori* grounds that the habits of the enervated and effeminate residents of the tropics would not be countenanced, seem to have, in the larger centers of population, the effect of stimulating the passions of men and women crowded together densely in the cities and seeking in drink and debauchery a respite from the cheerlessness of an inhospitable climate.

Syphilis prevails extensively in Great Britain, more particularly along the coast lines of England and Scotland, and in the larger cities, such as Edinburgh, Dublin, London, Liverpool, and Manchester. More than one and a half million individuals of both sexes are thought to suffer annually from the disease in these islands, though absolute reliance can not be placed upon statistics of this character, which are based largely on calculation rather than on absolute registration. The subject has been regarded of such importance in connection with the public health of the people of the British Empire, more particularly with regard to the sanitation of the army and navy, that laws to a certain extent regulating public prostitution have been there enforced.

In Belgium, Prussia, Denmark, Switzerland, Austria, Germany, and Italy syphilis prevails with an intensity and frequency varying with the social conditions and enterprises of successive years. The statistics furnished by experts in these countries are in general gathered from venereal patients submitted in hospital to the treatment of physicians, and are confusing to the student of syphilis, since they to a large extent represent the totals of cases, both local sores ("chancrelle," "soft chancre," etc.), blennorrhagias, etc., and also because they do not furnish the basis for an estimate of the number of cases occurring which are never reported in private practice. It is probable that somewhere between five and fifteen per cent

of all venereal eases are syphilitic ; and, of all diseases treated by physicians, it is surmised that, in the densest populations of Europe, between one and five persons in a thousand have been infected with the disease.

France, since syphilis first was christened with its name, has been the country where, up to within a comparatively recent period, the disease has extensively prevailed, been carefully investigated, and become most familiar to the common people. Mauriac believes that there are annually between five and eight thousand persons infected with the disease in Paris alone ; which suggests that between two and four in every thousand of the citizens of that metropolis are newly infected persons.

In eastern Europe—Hungary, Croatia, Roumania, Albania—and the islands of the Mediterranean Sea, syphilis prevails in almost numerical proportion to the population and commercial activities of the people in the countries named. In such mountain districts, for example, as Albania, the hardy mountaineers, little corrupted by admixture with the traders of the Adriatic, furnish an illustration of the rarity and benignity of the disease, to which a strong contrast is afforded on the island of Malta, where, on account of the trading facilities offered by the supplies there of cheap goods of British manufacture, the proportion of syphilitic to healthy soldiers in a single English regiment was at one time reported as high as fifty-seven. Gibraltar occupies in western Europe almost an identical position as respects commerce and social intercourse between the people of Spain, Africa, and the Mediterranean ports ; and it also pays a price in the spread of syphilitic disorders for its profits in barter.

Turning to the Asiatic continent, we find, as usual, the disease extensive in densely populated centers, like those of Japan and China, where so severe have been the consequences to sailors and others visiting their seaports, that the words “Chinese pox” and “Japanese pox” have almost passed into the English vernacular. But it is well known to-day that these names merely signify lesions of a disease made familiar by a daily experience to the attending physicians and surgeons of all the larger hospitals of Europe and America. It is reported, however, that in the interior of these countries, to which the foreigner has not yet penetrated with ease, there is a distinct decadence in the frequency and severity of the disease. In Asiatic Russia, Siberia, Kamtehatka, Afghanistan, Beloochistan, Syria, Asia Minor, and all parts of India, eases of the disease are reported always in greatest diffusion in the centers of population and trade.

Syphilis exists in every district of Africa that borders on the coast line. In Egypt, especially in Alexandria and Cairo, so largely visited by foreigners, the disease prevails not only among the latter, but also among the native fellahs and fellahines. As in the Sandwich Islands, it is here often commingled with lepra and other diseases. It can be traced along

the Mediterranean shores to Tripoli, Tunis, and Tangiers; thence along the western seaboard to St. Paul de Loando and the Cape. It exists also in Algiers, Abyssinia, and Madagascar. According to travelers in central Africa, the negroes of that vast region are not affected with syphilis, and, when the malady is once imported among them, are singularly exempt from its graver forms. These statements are to be accepted only with great caution. Certainly the diffusion of the disease among the inhabitants of the Cape is quite comparable with that observed in the larger capitals of Europe; and there is no need to imagine that an admixture with the blood of the white is needed to furnish a fit culture-field for the germs of the disease. The fact, if such it be, is to be explained by the scanty opportunities thus far afforded for the transmission of the disease by the medium of the few companies of half-exhausted but venturesome foreigners who have thus far penetrated to the recesses of the dark continent.

Syphilis exists in nearly every part of the Western hemisphere, to a much less extent in Greenland and the vast wastes of British North America than in the larger towns of Canada, such as Montreal, Quebec, and Ottawa. In the United States of America syphilis is to be found in most of the larger populous centers, being most abundant in New York, Chicago, San Francisco, New Orleans, Philadelphia, Boston, Baltimore, and Buffalo. In very many of the smaller towns and villages, particularly of the interior and in districts little visited by steam vessels and railway carriages, it is practically unknown. It is of rarest occurrence among the country people of distinct type, such as may be found visited by tourists, but little or only for a brief period during the summer, in the forests of Maine, along the shores of the New England capes, in the rural populations of Alabama and Wisconsin, and among the dwellers on the islands of the sounds, the bays, and the Great Lakes. It exists among the native American Indians, particularly those who have come into intimate relations with the whites during the last two decades, but is almost unknown among the few descendants of the Indians still living in small communities, under protection of the laws, among the older Eastern States of the Union.

Syphilis is exceedingly common among the American negroes, furnishing in them the combinations of that disease with serofula which are the wretched sequences of their long years of slavery to the dominant race—a bondage, however, permitting concubinage to an extent that is written in the faces of the mulattoes and quadroons of all parts of the country, particularly in the Southern and Middle States. Syphilis among the negroes still living in numbers near the ground formerly tilled by them for their owners is, as might be expected, less prevalent than among those living in the large cities. So extensive is the disease among these

blacks and half blacks serving as cooks, waiters, domestic servants, porters, etc., that it is believed few of those at service in the great caravansaries can be found free themselves from all signs of the disease, and the children of parents equally free. Of the Chinese living in this country as temporary immigrants, it may be said that many are infected with the disease, as well as with lepra, which exists chiefly among those in California. The other foreigners living on American soil and chiefly affected with the malady are, in the order named, the Canadian-French, the Mexicans, the creoles, the Spanish immigrants from South America, and those of Scandinavian birth. The immigrants to the United States least often infected and most rarely contracting disease after immigration are the English, the Scotch, the Irish, and the Germans. In the matter of religion, the lower class of Jews are more often infected with the disease than are the same class of the Roman Catholic faith.

The spread of syphilis among the native American population, whether children of immigrants or of those several generations removed from immigration, is affected by social habits like those of the Old World. For the smaller towns, the disease follows with singular facility the lines of interstate commerce, and the borders of advance observed by the railways as they penetrate to prairie or mountain, where is hidden mineral wealth. As to the former, the commercial traveler, visiting assiduously every possible point where sales may be made, usually unmarried and necessarily accustomed to the most irregular living, may be cited as the possible carrier of disease from one point to another; while the mining and railway camps of the outposts of civilization are usually earliest to sow the seeds of a disease reaped later by those who follow them with the erection of permanent homes for their families. A map of the United States, indicating with dark lines the extension and directions of extent of syphilis, would probably show a fan-shaped figure, the point of the handle in the city of New York, the other extremity of the handle in the city of Chicago, the rim of the fan spread more thinly along the seaboard from Alaska to Texas. The older States of the Union above and below this figure, New England and the State of New York above, and the Southeastern States below, would, without question, appear relatively free. These statements are based on a study of the statistics of the disease as they have appeared from time to time in the medical literature of the country.

During the late civil war of the United States these estimates would not have held good. The massing of enormous numbers of men in novel situations altered to a surprising degree the localities and preponderance of many diseases not directly due to the contingencies of battle. In this particular, syphilis shared with scabies for a few years an unenviable preponderance.

EVOLUTION, COURSE, AND STAGES OF SYPHILIS.

Syphilis is conveyed from individual to individual by acquisition ("contact syphilis" of the Germans), and by inheritance. The evolution of the disease in the two cases is marked by decided differences.

In acquired forms of the disease the infectious germ or its infective products may be conveyed in a physiological or pathological fluid, or in living or dead protoplasm, or be the result of such intimate tissue-conjunction that the morbid materies passes directly from person to person. The exact constitution of the "virus" has not been as yet determined. It is the belief of the scientific world to-day that the infective essence is either a micro-organism, or its material products the results of its invasion of living tissues. In the infected person capable of transmitting the disease the uncontaminated physiological secretions are not known to be capable of becoming vehicles of the virus. Once commingled with pathological secretions they become virus carriers. The power of furnishing an infected virus wanes with the progress of the disease. A person suffering from the grave forms of an ancient syphilis may be, as regards sound persons, innocuous. Given, therefore, an infected individual in an early and infective stage of the disease, furnishing a secretion from his moist mouth lesions, or anal plaques, which is immediately applied to a raw or to an abraded surface of skin or mucous membrane, or over an unbroken surface where it is left in contact and subsequently produces its own erosion; or which, lastly, is mediately applied on a utensil or article of clothing at the point where the virus gains access to the sound individual, an "infection" results. At this point of infection and at the moment of its completion a pathological process begins, which results later in the local evidence of that infection, viz., a chancre. A period of incubation succeeds the moment of infection before the evolution of the chancre becomes clinically evident. This period of incubation lasts from between fifteen to thirty-five or forty days. The average of most carefully watched cases is twenty-one days. Analogy teaches that during this interval the germs conveyed in the infective process are multiplying, and inducing that series of changes which result in the noxious products of invasion.

Thus early, then, in the course of the disease, we are confronted with a question of time. This question, as will be seen, has been assigned in the past an undue importance, because of its striking significance in this early period of the disease.

Once developed, the chancre signifies that the patient is syphilitic. The latest results of the study of the disease have not thus far destroyed the value of the old axioms, that every case of acquired syphilis means a precedent chancre, and every chancre a consequent syphilis. The cases

of acquired syphilis reported without chancre are known to be those merely in which no chancre was discovered.

There is no need in these pages to thrash over again the old straw of the "unicity or duality of the chancrous virus." No one to-day doubts that syphilis is a unique disease, and that in a thousand forms, mayhap, but always with some sign of specificity, its first obvious symptom after contact transmission is a chancre. Usually this lesion is a moist or dry papule, which, because of its more or less rapidly acquired, slight or dense subjacent induration, is known as the "initial sclerosis" of the disease. The sclerotic deposit within or beneath the lesion apparent to the eye, due to an infiltration of connective tissue and a multiplication of cells within and about the lymph and blood-vessels, may occur at any point where transmission has been effective, upon a sound or pathologically altered skin or mucous membrane of any part of the human body, upon a cigarette-burn of the lip, upon a herpetic vesicle of the prepuce, over a sound frenum, a surgeon's wounded finger, or a nursing mother's nipple. Usually where infection operates, the chancre-bearer has never been previously infected. The exceptions are few, and those reported generally open to doubt. It is probably true that pseudo-chancres may occur in previously infected subjects that are not followed after healing by the usual sequelæ of the disease.

Neither from the length of the incubation stage, nor by signs apparent in the chancre, can trustworthy predictions be made as to the grade or duration of the oncoming disease. The mildest forms of chancre may be followed by grave syphilis; and the reverse is true, that with severe initial sclerosis, usually single but at times multiple, there may follow the most insignificant of systemic symptoms.

Usually soon after the appearance of the chancre, signs of an infective process appear in the enlargement and induration of one or several, usually the latter, of the lymphatic glands in the anatomical vicinity of the site of infection. These constitute the so-called syphilitic bubo. The adenopathy, as a rule, first noticeable between the sixth and tenth day after the appearance of the chancre, is well-nigh constant of occurrence, scarcely two per cent of cases escaping. In these few exceptions, when there may be a soft fullness rather than the characteristic marble-like hardness of the pleiad of glands involved, it is supposed that the lymphatics leading to the part are sealed up by the rare accidents of gangrene, phagedæna, or other complications. This special adenopathy is justly regarded as the sign and seal of an escape of the specific toxine of the disease from its portal of access to the circulating fluids of the body, and through these channels to the system at large.

The term here employed is intentionally used to cover both the blood and the lymph channels. That the lymphatic glands are powerless both

to entrap and retain the virulent product wrought at the site of the chancre, needs no demonstration. This is proved by every case in which syphilis succeeds a typical dense adenopathy near an indurated chancre. Though there be an obliterating endarteritis in many cases at the chancre-site, the blood vascular channels must take part in this systemic intoxication—a part played at the moment when the glands exhibit their resentment of the morbid fluids conveyed to them from the site of inoculation. Though the evidence here is negative, it is not to be therefore ignored. Early excision of a typical chancre and of all enlarged glands in anatomical relation with it, has not sufficed to prevent the occurrence of general syphilis.

Attention has already been drawn to the historical and interesting fact that, by the late eminent Philip Ricord, the evolution of syphilis was divided into three stages, the primary, the secondary, and the tertiary. The primary included the symptoms briefly reviewed above, those concerning the chancre and its accompanying multiganglionic adenopathy. The secondary period included the symptoms displayed during the succeeding term, in which systemic infection occurred, with usually symmetrical and superficial cutaneous and other manifestations. This was loosely estimated at about one year in duration. Lastly, following this stage of efflorescence, came the tertiary period, that in which the deeper structures of the body are involved; that in which the disease commonly ceases to be transmissible, in which it may produce its most destructive effects, or pass into a complete innocuousness and decline. The influence of this doctrine of periods has been incalculably great and valuable. It at once marked a revolution in the history, in the study, and in the treatment of the disease. It has dominated the minds of the medical men of all lands since it was first completely grasped by the intellect of its master.

But it has served its day. To thoroughly grasp the problems of syphilis, it is now needful, for the time being, to emancipate the mind wholly from the ingenious suggestiveness of this doctrine. It must be clearly seen to be nothing but an artificial device for classifying in a clumsy way the clinical phenomena of the disease.

As a matter of fact, there is no line of demarcation between the successive phenomena of syphilis as they appear in the evolution of the disease in any given case. From the moment when infection has been wrought to that of the gravest injuries, or of the mildest efflorescence, there is, when no arrest occurs, a gradual but continuous progression of the disease. This advance is commonly marked by interludes as striking as they are salutary. They may be due to the intervention of treatment, or to changes in the general health of the infected due to other causes. Apparently capricious cessation of the advance of the disease may occur,

since even the cutaneous symptoms of marked cases may wholly disappear without treatment. If we were in position to view with keenest scrutiny the unmodified progress of syphilis in cell and vessel, no one can doubt that the so-called period of incubation would disappear, and the microscopic eye of the observer would be as busily occupied during that as throughout any other period of the disease. Similarly there would be no sharp distinction possible between primary and secondary syphilis. One could scarcely note the hour when, from the first to the last, there was not in progress a slow and gradual progression from point to point of the toxæmic product originating in the changes wrought at the site and at the time of infection.

These suggestions are needed for a clear comprehension of the phenomena following the stage of so-called "primary syphilis." The "primary" hypothesis made it absolutely necessary to also assume that after the primary came a secondary, and, after a secondary, an inevitable tertiary stage. More, the mind thus habituated to a study of the evolution of the disease in periods, looked to an evolution of symptoms in these periods in due order and line of procession. One was thus educated to expect in a typical and uninterrupted attack of syphilis (could such be observed) each and every one of the several manifestations of the disease. After macules, papules should appear, and, in course, pustules, tubercles, gummata, ulcers, and successive involvement of organ after organ of the body. Some such definiteness of order is, in point of fact, to be recognized in the evolution of variola, with which, unfortunately, syphilis has been too often and too closely compared.

But no such syphilitic history has ever been observed. It is the artificial manikin of the schools, the figment required by the domination of the medical mind by the time rules of the French school. It was this once useful and ingenious time schedule which made it equally imperative for the French to coin for some of the manifestations of syphilis the striking terms "precoious" and "tardy," words which embody a confession of the weakness of the schedule to explain all the exact clinical pictures of the disease.

Dismissing, then, the conclusions based on this wholly artificial scheme, it can be clearly recognized that almost immediately after lymphatic adenopathy has declared to the eye and the finger of the observer that the toxic product of the chancre-site is finding its way into the vascular channels of the body, the phenomena of the disease are evolved, not in the order of a time card, but, to employ a different figure, in radii from a pathological center. Early, indeed, in many cases, can it be seen that the future of the malady is to be sought along one or another line toward exceedingly variant results. The complexus of these results may be conveniently classified in four divisions, which are named later.

Toward these the advance is either slow or rapid. The gravest may be imminent when the chancre is yet unhealed, the adenopathy unrelieved, the lymphangitis discernible. The mildest may be attained when months have passed, the early accidents well-nigh imperceptible or forgotten, and the general health of the infected individual meanwhile not manifestly impaired.

Whether this apparent interval (the so-called "secondary period of incubation") be brief or protracted, none can doubt that when an ultimate evolution of the disease occurs there is a continuous progress toward systemic intoxication. When well marked, this apparent interval occupies from forty to fifty days, but it has been noted as brief as twenty and as prolonged as a twelvemonth. Its limits are usually defined between the date of the chancre appearance on the one hand and the date of the first cutaneous exanthem on the other. That this is a purely artificial distinction, becomes at once apparent when one of these dates of limitation is questioned. There is nothing in a cutaneous exanthem which entitles it to pre-eminence above other symptoms of syphilitic invasion perfectly evident during the so-called second incubative stage. From the date first assigned to the last arbitrarily selected, there is no real pause, no conspicuous absence of invasion signs. On the contrary, the symptoms of this period are often more suggestive and significant than when, for example, the skin of the patient's belly is merely sprinkled with a macular syphiloderm.

The merest enumeration of symptoms possibly occurring in this period of apparent pause is sufficient to indicate that no real incubation can be observed. Yet here, again, it is important to note that not all of the enumerated symptoms are to be observed in one individual; and, further, that they observe no definite order when two or more chance to be parts of one syphilitic history. Rather are they different surface indications of the several lines along one or another of which the disease may advance toward its ultimate results.

After the chancre appears and before the first exanthem of general syphilis follows, the condition of the average patient is far from an apparently sound health. The blood-globules commonly decrease, while the leucocytes by actual enumeration increase in number. The glands of the body elsewhere than those in the region of adenopathy near the chancre-site slowly or suddenly enlarge, become tumid, painless, much less indurated than those first noted in the disease, and are often symmetrically rather than, as in the other instance, asymmetrically involved. The spleen, so intimately is it concerned with the fluids traversing the vascular channels, becomes tumid and at times tender. The liver function is often disturbed, as shown by an icteroid skin, with muddy conjunctivæ and the appearance of bile-products in the urine. The functions of

the stomach, of the bladder, of the uterus, of the suprarenal capsules, and of other viscera, may be even seriously impaired. Continuous or interrupted febrile temperatures may be reached, the thermometer rising at times even to 105° Fahr., the patient being not rarely treated, by a physician ignorant of the nature of the effective poison, for an intermittent or relapsing fever. The nervous system may seriously suffer. Atrocious neuralgias, substernal and periosteal pains, pains in the bones and joints, osteocopic sensations, and even synovial effusions, may be the protest of the system against the advent of the recently introduced poison. Often there are signs of mischief even of a severer type. The lassitude and depression are profound; a condition of mental hebetude gives place to partial syncope; a headache results in a temporary strabismus; a pain in the upper or lower limbs is followed by muscular contracture. None can doubt that in a carefully studied case where the evolution of syphilis is actually in progress, however mild its future is to be, a skilled diagnostician could recognize at one point or another of the body presumed to be in the stage of this so-called secondary incubation, unmistakable evidences of an insidious advance of the malady.

The term "explosion" has been repeatedly employed, with many other metaphorical phrases, to describe the moment when the first cutaneous exanthem appears. Its use is an index of the absurd and extravagant importance attributed to the onset of skin symptoms in early syphilis. As a matter of fact, the latter are surface indications of more serious and deeper processes (probably involving the nervous centers), and are all-important to the eye only of the vulgar. As a matter of fact, too, they never occur by explosion. The first efflorescence of the disease may be as gradual as the dawn of day and as impossible to define. Before the human eye traces its first expression, the camera of the photograph can produce with fidelity the faint mottlings of a skin that is to be later visibly the seat of a syphilitic efflorescence. No one who has with minute care watched the oncoming of the cutaneous manifestations of the disease can have failed to note how insidiously the approach is made to the eye. An accident may change all. The excessive heating of the body in a bath, or by dancing, may simply precipitate the blushing of the first rash.

This once apparent—and, let it be noted, even without this—syphilis exposes its advance in numberless directions, probably in no two cases exactly the same. These advances may be, however, for practical purposes, classified in four principal directions, as previously suggested in these pages. They may be named and briefly sketched as follows:

I. *Benignant syphilis, with mild and transitory symptoms.*

Every vacciniculturist has recognized the fact that a few heifers fail to respond to all efforts to inoculate the udder with vaccinia. The reason

is not explained : the system of a few individuals in every thousand simply refuses to react against the introduction of the poison. No expert of wide experience can fail to have been impressed with the fact of the existence of this exceptional class of human subjects with respect to syphilis.

There are persons who exhibit typical chancre with characteristic adenopathy of the veinage, who never after exhibit the slightest signs of systemic disease. The objection to this statement is suggested at once to the mind of the uneducated. It is, that an error was made in the diagnosis of the initial sclerosis. That which seemed to be a syphilitic chancre was really not such, but spurious, an imitation of the genuine lesion. But, it is responded, such chancres have been not carelessly but with exquisite skill studied by experts, and found not different from others followed by grave syphilis. Further, the persons enjoying this immunity have failed later to contract the disease when exposed to it ; and, more important than all else, individuals of this class correspond to others of the same class who, having actually exhibited such chancres, do later have systemic symptoms of such mild type as to astonish those unfamiliar with these singular exceptions to the rule.

These interesting exceptions are either the triumphant proofs of the skill of the physician, or (what is far more probable) proofs that some of the phenomena of natural law defy ultimate analysis by the human mind. Persons of this class have typical, severe or mild, premonitory chancres. In due time they have also slight ganglionic engorgement, post-occipital, along the nucha, or in the line of the sterno-cleido-mastoid muscle. An exanthem occurs, of macular type, upon the belly, over the chest, slightly upon the face, or perhaps limited to the trunk. When this fades, with or even without medical treatment, the disease is absolutely at an end. The ignorant declare that ten, fifteen, or twenty years after, this individual will suffer from a gumma of brain or liver, and be the worse for the mildness of his early syphilitic history. But some of these patients have been watched during the longer of the intervals named, without signs of resulting disease. Only the obstinacy of fixed prejudice can refuse to accept the necessary conclusions. These cases are not the figments of the imagination, but are annually observed in every extensive syphilitic practice. They are not rarely seen in women who have been infected, without their knowledge, by a husband, or by the innocent contacts of daily life.

II. *Benignant syphilis, with relapsing or persistent superficial symptoms.*

Cases assignable to this category are those in which typical chancres are followed by typical early manifestations of general syphilis, the patient continuing for months, or even years after, to be annoyed by intract-

ably persistent or relapsing but wholly superficial syphilitic symptoms. If described according to the former phraseology, these would be classed with the subjects of prolonged secondary syphilis, never proceeding to tertiary stages. Two, three, and four years after infection such subjects are found with an infiltrated patch of scaling papules on buttock or back; with mucous patches of lips, tongue, or fauces; with a squamous palmar or plantar syphiloderma; or with a cluster of superficial and crusted papulo-pustules over the occiput or temple in the pilary region. After alternately trying and tiring of all methods of treatment, the disease at last yields. Throughout all, from first to last, there is no sign of a formidable malady. When recovery has at last occurred, no trace is left on the body of the infective process. There has been no deep ulcer, no cicatrix, no permanent impairment of any organ or tissue. The disease, viewed in retrospect, has been perhaps a long but always rather an annoying than a dangerous affection. It may never have for a day prevented attention to the routine work of the sufferer. Had it not been for the incidental apprehension of the future, it would not have attracted serious attention nor demanded assiduous care.

Such, without any question whatever, is the course of the majority of all cases of syphilis. They are watched with intensest anxiety by many physicians, lest the serious phases of syphilis ensue, and with feverish alternations of hope and despair by the nervous and instructed of those who endure the ordeal. It is these which furnish the text for the prophets who claim that, however mild be these histories, each is liable to result in the graver forms of the disease, and that which determines the difference is treatment, always of highest importance. Against this palpable error—an error fostered by the pitiless time-schedule of the French school—it is proper to protest. The most superficial study of syphilitic statistics demonstrates without flaw that the majority of all patients—with the best, with the poorest, and without treatment—escape what has long been termed tertiary syphilis; in other words, do not exhibit the destructive types of the disease. The percentage of the latter to the former in both hospital and private practice has been estimated at the lowest at about seven per cent, at the highest at nearly thirty per cent. The corollary therefore is wholly trustworthy that at the least two thirds of all patients in all countries, and subjected to all methods of treatment or none (homœopathy, ignored cases, expectant treatment, “mind-cure,” etc.), escape the destructive ravages of the disease. It is upon this issue in the immense majority, and not upon the dreaded results in the minority, that the evolution of syphilis in the average of cases is to be predicated. Nothing that is here set down is to be interpreted in denial of the equally palpable fact that the mildest case of syphilis at the outset may become the severest in the end; that the patient fairly launched in

the direction of benignancy may be mischievously turned in a different and more dangerous course; that scientific treatment of the disease furnishes one of the greatest triumphs of human ingenuity and skill. It is here intended merely to look at the results of the evolution of the disease among all classes of men and in all countries from the broadest point of view. The lesson taught, not for the one case but for the many in such a study, is that in this second category of mild relapsing or persistent superficial symptoms are wholly included the immense number of all cases and of all phenomena of the disease.

III. *Malignant syphilis, with relapsing or persistent profound symptoms.*

A recent French writer has well distinguished between the syphiloma that resolves and that which degenerates. In this third category are included all patients exhibiting gummatous lesions that are either resolved and do not return but leave serious consequences behind; or that are resolved and return later with serious consequences after either or all outbreaks; or that persist with no less harmful results. Here, too, are variations from the less to the more dangerous grades.

Any one of these conditions may develop after the patient has exhibited only such lesions as would justify his being classed in the category just considered. But it is highly important to note that all the symptoms here described and catalogued may succeed the chancre stage without intervention of milder symptoms and also without an interval of time. Early, indeed, after the chancre has healed, often before this last is completed, there are indications of the evolution of the disease toward a malignant type.

The "malignancy" of this class of cases is seen in the deterioration of the general system, and the production of a syphilitic cachexia without absolute destruction of the tissues of the body. Gummata that never ulcerate or degenerate may form in the skin, subcutaneous tissue, bones, periosteum, periarticular and articular tissues, mammary gland, testis, or other organ. By the production of pain, by displacement, or mechanical effects, by a subtle influence that is difficult of analysis on chylopoësis, sanguification, or nutrition, and by interference with other functions, a disastrous influence is exerted that justifies the term malignancy in describing the course of the disease. Its effect is most striking when the structural lesions are few and not in themselves grave. A patient with merely a submaxillary or periosteal gumma, or with an obstinate pachymeningitis producing injury by pressure effects rather than by destructive action, may be in a graver physical state than another with a profound ulcer of the leg or of the throat.

In this category are to be found the smaller number of all cases of syphilis. It is pre-eminently the category of the transitory. They who

have suffered from a syphilis trending along these lines, either by force of good management or as a result of the self-limiting energy of the disease or the reverse of these, are readily transferred to the class just described, or that which is considered below.

IV. *Malignant syphilis, with relapsing or persistent and profound lesions that are ultimately destructive.*

In this category are classed all those patients who exhibit the worst phases of what is called by the French "*tertiarisme*," the symptoms which have made the disease to be dreaded as much as any of the pestilences which have visited destruction upon the human family; the histories which have engendered the popular and *quasi*-professional belief in the noneurability of the disease; those which have led philosophers to wish that the disease were one that killed rather than one that can so frightfully mutilate without killing.

Here the resolving or disintegrating gumma opens an avenue to ulceration that pierces through connective tissue, cartilage, periosteum, and bone; to resorptive results which when the gumma has disappeared, leave in its site shriveled secreting cells, nervous, hepatic, renal, osteoid; that leave the testicle a shrunken miniature of its former self; that leave a sclerotic tissue in the place of brain-cells or spinal cells, whereby one half of the body loses its motor function, or a portion of the brain its ability to preside over the function of speech. Here, too, remote as are these formidable consequences on the time-schedule of the French school, all are obliged to admit that but a few weeks may intervene between the chancre-evolution and the worst ruin. In a few days, while yet the induration of the chancre persists, the hard palate may be perforated as readily as the finger may be pushed through a sheet of wet paper; or a liver may be stuffed with ominous nodules; or the surface of the body plowed here and there with deep and even gangrenous excavations where a gummatous infiltration has rapidly melted to destruction. It is true that for the most part these grave results occur between the third and fourth year after infection; but the facts of earliest appearance of so-called late symptoms in syphilis are by none better attested than by the French themselves. It is they, indeed, who have coined for science the phrases "*malignant precocious syphilides*," and others of similar import. It is they who freely admit that the malignancy and precocity are in these cases intimately associated. It may even be asserted as a fact that the majority of all truly malignant manifestations of syphilis are precocious to the extent of violating the old rule of tertiary syphilis as a sequel of an orderly and classically developed secondary stage. It is the characteristic of these dreaded devastations of the malady that they are early declared and rapidly evolved as extremely formidable types rather than as dangerous complications or perilous sequels of lues. Even with

the chancre unhealed, the surface of the body may be in these cases riddled with sloughing cavities. It is also the French who, confessing that these are the cases inexplicable by their formula, have coined for them the significant and comprehensive appellation, "galloping syphilis."

Between the four main lines of evolution briefly delineated above, there are to be recognized clinically innumerable variations in the direction of both mild and severe symptoms. That these types mutually merge and are to a degree interchangeable by the accidents of environment, constitutional influences, and treatment, can not be questioned. It is therefore important to inquire what are the determining causes which make the syphilitic attack of one individual so different from that of another that the physician who is quite qualified to make a diagnosis of the one at sight, so utterly fails in the case of the other that the disease may actually progress for years under his observation without being recognized.

Our ignorance at present of the limitations of existence and of development of the germs whose toxine produces the disease, wraps many of these causes in mystery. But upon some of them one may pronounce with reasonable certainty.

For a certain school of writers the chief difference between these variations in the expression of the disease is the absence of all treatment or the several extremes of ignorant, indifferent, or scientific treatment of the disease. To this wholly artificial explanation exception must be taken, since a cause of this sort, in order to account for the occurrence of a large number of cases, should operate generally, which it is impossible to assert of the different grades of treatment employed over the world for the relief of the disease. Looking at the immense number of cases subjected to observation in all civilized and uncivilized countries and making allowance for the very imperfect methods adopted in different countries and for the absence of efficient treatment in many, it is at once noticeable that as many grave cases are catalogued in London, Paris, New York, and Chicago, as among the degraded classes in Italy or Spain, or among the negroes of America, all of whom are little likely to be influenced in their diseases by scientific treatment. As a matter of fact, also, in the gravest of "galloping" cases, as every candid observer must admit, it is idle to assert that there has been time for even the amplest and best-directed treatment to save the patient from malignancy, or for the very poorest or the absence of all medication to be responsible for the grave result. An efficient and demonstrable cause should be best declared when the result is immediate and striking.

Again, it has been surmised by authors of repute that the difference in these cases is explicable by a difference in the activity of the germ or

by a variation in the intensity of the virus. But to this a negative is clearly set up by the citation of innumerable cases where, of several individuals infected from one person, no two exhibit the same degree of virulence in the character of the symptoms induced. The same is shown by confrontations in a series where the individual infected from the gravest types of the disease has mild syphilis, and another contracting the disease from this mildly affected patient pays a heavy forfeit for the occurrence of the accident.

Critically examined, the problem speedily resolves itself into a question concerning chiefly the soil in which the germ is planted, and the favorable or unfavorable conditions under which it develops and fructifies. Here is a large field of efficient causes which operate equally in all countries and under all skies. Looking at this field critically, we are at once struck with the fact that syphilis here aligns itself with all other diseases that destroy the race. Here, as in equally chronic tuberculous processes, in protracted cases of tissue-changes in lung, kidney, or liver, the debilitated, the exsanguine, and the congenitally weak, suffer more seriously than the men and women of brawn, of blood, and of vigor. Here operate with impressive energy the causes catalogued in the etiological chapter of every work on special diseases, viz., alcoholism, debauchery, pauperism, hospitalism, "misery," in the large sense in which the French use that term, and the wasting effects of all precedent illnesses and injuries. With other diseases, let it be noted in passing, there is small tendency in syphilis to combine. All have noted the smallness of the number of cases in which syphilis has coexisted in one individual with tuberculosis, carcinoma, or sarcoma. One might almost assert that it is with lepra alone that the disease has been in the history of medicine mingled to confusion.

Apart from the causes suggested above, it is well known that very fleshy persons, the aged and very young, are exceedingly liable to suffer from severe forms of the disease. Young adults of both sexes, neither fleshy nor thin, with good development, fair inherited vigor, and not debilitated by any acquired vices or exposures, commonly escape the serious issues of lues. It is an interesting commentary on the preponderance of causes effective in the production of grave syphilis, that decidedly the simplest cases, as regards the evolution of the malady, are those of persons infected by nonvenereal accidents, where knowledge of the nature of the disorder is speedily acquired.

It is, then, by the operation of the several causes suggested above, rather than by peculiarities of treatment or by the activity of the acquired virus, that the infected cases range themselves in the categories of evolution briefly described above. In the fourth, which includes the destructive and formidable ravages of the disease, there will always be inscribed

the largest number of names of the cachectic, the dissipated, the aged, the impoverished, the filthy, the neglected, and the weak.

This all admitted, it is scarcely necessary to further affirm that there are few triumphs of mind over matter to be compared with the brilliant results obtained in a systematic and skillful treatment of this disease, results sufficient in many cases to determine whether any given subject shall be exchanged from one to another of the several classes here described; or be, in fact, so slightly infected as scarcely to deserve recognition in any one of the four.

CONGENITAL (HEREDITARY) SYPHILIS.

Infants and children of a tender age acquire syphilis, as do their elders, by contact-accidents (kissing, use of domestic utensils soiled with contagious secretions, nursing from the breast of a syphilitic woman not its own mother, attempts at rape, etc.). There are, however, instances of acquired disease in infants (infantile syphilis) where the symptoms do not differ greatly from those of acquired disease in adults. It is true that the tender skins of these patients make them rather more sensitive to external irritants, and are much more apt to display moist lesions about the vulva, anus, genital region, and the soft, *quasi*-mucous surfaces between their almost disused fingers and toes. But in these cases the children and infants are presumably in fair health when infected; the disease, if it attack the organs more deeply placed than the skin, making these advances by its accustomed parallels.

In congenital syphilis, on the other hand, the disease is always strictly inherited. The new being is poisoned *ab ovo*, and is ushered into the world either as an aborted ovum, a miscarried foetus, a nonviable infant, or as a newborn child surviving the peril to life only to exhibit, usually before the fourth month, symptoms unmistakably pointing to the disease of one or both parents. Here is not space to discuss the question whether syphilis of the child always implies that of the mother. Whether demonstrable or not by external symptoms, the latter is certainly shown in most cases; and in the few reported exceptions there is grave doubt whether they really be such. The law of Colles, that the mother of the syphilitic child is never infected by the mouth of her offspring, though every sound woman who places such a child at her breast is liable to suffer, has, after years of study, been so seldom violated that it has been buttressed by the broadest experience. Indeed, though mothers of syphilitic children are repeatedly found where the most careful scrutiny reveals no trace of the disease, women with such a history are now well recognized in their relations to syphilis. They are the protected victims of the disease. They belong to precisely the same class as do the men who, having had the most trifling of syphilitic symptoms, forever after enjoy immunity

against the ingress of the poison. These mothers have had their symptom, as significant as it was in every view morbid. That symptom was the casting off of a syphilitic ovum, foetus, or child, or of a series of such fruits of conception. These pathological evidences of disease are often the sole apparent maternal symptoms of infection; and, in fact the profoundly syphilitic child seems often to be a symptom-carrier, a species of explosion of the disease on the part of the mother. Often such mothers are pallid and weak; but they not rarely are found presenting all external evidences of robust health, with rosy cheeks, brawny limbs, and breasts full of nutritious milk, which the weazened, yellow-tinted, snuffling, and puny syphilitic child is wholly incapable of assimilating.

Many of the problems connected with the transmission of syphilis to a second generation are still unsolved. It is well known that transmission to a third generation is exceedingly rare; that the child of parents with syphilis then recent is more apt to suffer than its younger brothers and sisters, begotten when the disease of the progenitors has lost its virulence; that a syphilitic father, with a sound mother, is not certainly known to be able to contaminate the fruit of conception, if the wife be not infected; that after conception, infection of the mother may contaminate the offspring, if the syphilis dates from the earlier periods of the pregnancy, though it is thought by a small number of observers that after the seventh month of such pregnancy the child escapes the maternal virus. It is also clear that, as the disease wanes in the parents, a series of pregnancies usually results in the production of more and more viable offspring; and that finally, after abortions and miscarriages, even sound children may be born; that in cases, as the disease of the progenitors waxes and wanes toward a decline, or is improved or the reverse by vigorous treatment or neglect of the latter, diseased and healthy children may be alternately begotten in the series.

The living syphilitic child is brought into the world diseased in any or all of its tissues. It may be recognized at birth as the victim of gummata of liver, bone, lung, testis, thymus, spleen, eye, ear, or skin. The characteristic "snuffles," due to involvement of the mucous membrane of the nose; the pemphigoid lesions of palms and soles; the osteo-chondritis of the epiphyso-diaphyseal junction in the lower extremity of the radius; the fissures, excoriations, and mucous papules of anus, lips, or vulva—all may be declared without observation of order in their evolution or progress toward destructive change. When survival is enjoyed till the later periods—that is, with a first display of congenital symptoms in the tenth, eleventh, or even twenty-first year of life—the well-nigh remediless distortions, ulcerations, and atrophies which result are among the gravest of the destructive ravages of the disease. For the majority of all forms of inherited syphilis the issue is fatal. The affection is one which may be

described as reserving its deadliest shaft for the victims of the second generation.

GENERAL PATHOLOGICAL ANATOMY.

After a series of unsuccessful attempts previously made to identify the micro-organisms whose toxic product results in the production of the lesions of syphilis, Lustgarten has described a bacillus which has been recognized in the centers of a syphilitic process in almost every stage of the disease. It measures from three to seven millimetres in length, is moderately curved upon itself, and has slightly swollen terminal extremities. It has been stained with gentian violet, and decolorized with permanganate of potassium and a sulphuric-acid bath. Under the microscope, three or four of these bacilli may be found both within and between the masses of protoplasm. Unfortunately, this microbe has as yet not met the severe test of a truly pathogenic bacterium: from cultures no inoculation has been made with the result of producing syphilis. Whether, under improved methods of staining and culture, it or another be ultimately demonstrated as the effective pathogenic bacterium of this disease, the scientific world has to-day practically accepted the view that by the multiplication of some similar organism the characteristic virus of the disease receives its toxic characters. The sclerotic condition of the chancre is produced after the introduction of the virus at that point, by dense infiltration of the connective-tissue elements with embryonic cells, among which may be found isolated giant cells. The stuffing of the blood-vascular channels with these same cells, clustered too about the exterior of the lymph-channels, has already been referred to.

The syphiloma, or morbid product of syphilis in all its material lesions, is a neoplasm of granulation type. In these the upper layers of the corium are swollen with a semiliquid infiltration, the overlying epithelium participating with frequent inflammatory products in the general process of infarction. There is no building up of strictly new tissue in these formations; no new blood-vessels are at first formed. Later, with a more abundant infiltration, vascular elements are abundantly developed, as is especially well demonstrated in gummata of brain and testicle. Often, when scrutinized with the naked eye, gummata of viscera—of the liver, for example—are readily detected as minute grayish-red or grayish-white, pin-head and larger sized bodies, which under the microscope are found to be nests of well-packed embryonic cells, surrounded by a dense mesh of connective tissue with radiations passing toward the normal hepatic cells in every direction. These granulation masses undergo metamorphoses and are environed by the several results of tissue-changes noted elsewhere, such as inflammation, suppurative degeneration, caseation, fatty metamorphosis, and even absorption without result, save that

where such has occurred the normal cells have in consequence of displacement wholly disappeared.

In many cases the gummatous deposits of syphilis when occurring in distinctly circumscribed rather than in equally characteristic diffuse forms, exhibit after a time centrally placed caseous masses, either spheroidal in outline or wholly irregular, which are environed with a dense tissue of sclerotic hardness constituted of the transformed connective tissue, from which, as in the cases previously described, stellate radiations of similar nature stretch toward and often deeply into the surrounding normal tissue.

Gummatous infiltrations exhibit in the most marked degree the capacity of absorption and final disappearance without degeneration or ulceration. This peculiarity is nowhere better displayed than in the testis, where complete involution of one or several gummatous nodules may leave a shrunken and withered organ scarcely one fifth of its size before the involvement. The same picture is shown pathologically in the condition often described as *daetylitis syphilitica*, where, after absorption of the gummatous thickening, the phalanx which was originally three or four times its normal size is reduced to an attenuated shadow of its former self, or may even wholly disappear, and be represented, as the second phalanx by this process approximates the corresponding metacarpal bone, by a slender connective-tissue pedicle. When destructive effects by ulceration result from breaking down of a gummatous product, not merely does the infiltrated tissue ulcerate, but this process once begun may extend into sound tissue, the ulceration spreading and destroying in its path every opposing anatomical element. These processes are unquestionably advanced by the *endarteritis obliterans* which accompanies and even precedes so many of the syphilitic formations, the lumen of the vessels being often quite obliterated by thickening of the vascular walls, by an increase especially in the thickness of the middle layer.

The difference between the retrogressive metamorphosis of gummatous and other lesions lies objectively in the appearance, in the relics of all other processes, of a special pathological occurrence (for example, blood-staining of the walls of a cerebral cyst, after an apoplectic effusion in the brain), while the relics of the gummatous process, whether the sequels of resorption or ulceration, never bear evidences of any special pathological changes other than the mechanical loss of tissue.

In the matter of syphilitic gummata involving the nervous centers, the labors of Heubner, Wegner, Wilks, Barlow, Parrot, and others have thrown a flood of light upon the existence of tangible lesions in and near the nervous cells of brain and cord, in those fatal cases where, not many years since, even though syphilis was known to have been the cause of the fatal result, its exact mode of evolution was wholly unknown. The oe-

elusion of the lumen of the cerebral arteries, by thickening of the walls of these vessels, occurs in nearly every severe case. Spreading from this point of localized infarction, the indirect results may involve tissues at a distance from the site of the original gumma. As a consequence, softening, ulceration, caseation, and metamorphoses similar to those occurring in other pathological processes, may be hastened in localities where there had been no primary syphiloma.

These same features of syphilitic infection may be recognized pathologically in all its inherited forms. In these, too, the characteristically behaving gummatous product, circumscribed or diffused, invades organ and tissue with more disastrous results than in the adult, merely because the subject is infected *ab ovo* with the special toxine of the malady. Here, however, may be named, as of striking and peculiar behavior, the changes in cartilage and bone, which are believed to occur in almost every case of inherited disease. In one of the forms, for example, described by Wegner, of osteo-chondritis, at the epiphyso-diaphyseal extremity of a long bone, premature ossification goes on with the increased proliferation and growth of individual cells; or there may be actual arrest of the bone-making process by premature sclerosis of the intercellular hyaline matrix of the cartilage. An atrophy is also described by Parrot, where rosy or yellow-tinted jellylike foci develop at the line of junction of epiphysis and diaphysis, and where eventually, in place of a bone, a loose reticulum is formed of fibro-cellular structure.

In still other cases described chiefly by Parrot, osteophytes of varying thickness, projecting at right angles to the osseous shaft, develop from bony trabeculae, interlacing at one or several points beneath the periosteum. Examined under the microscope, there is recognized an exceedingly irregular arrangement of the Haversian canals and osteoblasts. In some instances these osteophytes result in the production of porosities at the points of involvement, the results being strikingly similar to those seen in rickets.

Before, however, the infant affected with inherited syphilis is brought into the world, it is probable that the placenta, with which it was connected *in utero*, was involved in a diffuse or circumscribed gummatous process in which the endometrium participated. Here have been recognized polypiform projections, of highly vascular constitution, nodes, tumorlike masses, sclerosed plaques, and other results of the syphilitic hyperplasia. Fusiform, roundish, and multinuclear cells here also proceed either to necrobiosis or to the organization of sclerotic masses, which do not differ from the results of the same hyperplasia in the bone syphilis of the congenitally affected, or from the changes exhibited by the gummata of the spleen in the acquired forms of the same disease.

Viewed as a whole, it must, however, be frankly admitted that, apart

from the distinct recognition of a special micro-organism in etiological relation with syphilis, the microscopic examination of its lesions, even by the most expert, is far from furnishing the most satisfactory results. There are very few modern pathologists who would to-day venture a diagnosis of syphilis after examination of tissue changed by a gummatous infiltration, if there has been no opportunity of studying the clinical history, objective gross symptoms, and behavior of the neoplasm under efficient treatment. A correct appreciation of the patient's history, and the detective influence of specific treatment, are most important in enabling us to discriminate between specific and nonspecific new growths. Even when the results of microscopical examination may appear to be conclusive, the verdict of the histologist may be reversed on appeal to the practical test of treatment. Nevertheless, in all tests, the valuable aids to diagnosis furnished by absence of the characteristic changes to be recognized in typical epitheliomata, sarcomata, myo-fibromata, and other morbid growths, can scarcely be overestimated.

Recent investigation indicates, indeed, with tolerable clearness, that the anatomico-pathological distinctions between the syphiloma, the lupoma, and the leproma on the one hand, and sarcomata, epitheliomata, and allied formations on the other, are best studied as variants of a normal histogenesis. They are, in fact, distinctions which do not solely rest upon the recognition of a bacillus, upon the chemical effect of ptomaines, upon the discovery of a "pseudo-parasite," of a giant-cell, of a psorosperm, or of evidences soon probably to be more distinctly appreciated, that a salutary phagocytosis has in any one of these morbid processes been interposed. The recognition of each will be rather more certainly determined by the mode of behavior of proliferated cells, infarcted lymph and vascular channels, and reticulated connective tissue; their tendencies to produce sclerosis which persist, or granulation masses which are apt to undergo necrobiosis; and their disposition either to become localized or to beget secondary deposits by metastasis.

A study, in short, of the histology of syphilis at the present day suggests in the most remarkable manner the fruits of a careful study of the clinical features of the same disease. It has been said that syphilis "imitates" almost every other disease. The figure is one suggestive of fact. In the study of its manifold clinical features it becomes apparent that these may, with the most deceptive minuteness, resemble those to be seen in nonsyphilitic disease; and yet, however close the resemblance, one is never left without a few signs of a specifically different malady, which may always be looked for with confidence, and, when discovered, trusted. So in the microscopical examination of tissues changed by the syphilitic process: they are not strikingly different from those examined in a thousand other morbid states. Their microscopical features may somewhat

resemble those displayed in the section of a cutaneous carcinoma or of nerve-tissue in lepra; but with careful scrutiny one may always distinguish certain peculiarities which enable the trained observer to declare that the two are not the same, and that the excursion is in the direction of the variations seen in syphilis.

THE ETIOLOGY OF SYPHILIS.

By JOHN A. FORDYCE, M. D.

EVERY-DAY experience teaches clinical observers that syphilis depends upon a virus which gains access to the system through a local abrasion, first producing local changes of an inflammatory character, then a slow infection of the communicating lymphatic glands, followed by a general disease with various local disorders in the skin and mucous membranes. After a gradual subsidence of the symptoms through treatment or spontaneously, a period of latency in the manifestations supervenes, followed in some instances by recurrences of lesions, probably from portions of the virus deposited in the tissues and aroused into activity by various causes.

It was suspected, long before the elaboration of the germ theory of disease, that syphilis owed its origin to a living contagion that adhered to the specific lesions and was present in the blood of persons affected with the disease; that it could be conveyed both directly and by inheritance, and might remain in the body in a latent condition. Fernelius, in the beginning of the sixteenth century, clearly expressed opinions regarding the infectious nature and hereditary transmission of the disease which to-day retain their full value.

Modern pathology has grouped a class of diseases under the name of chronic infective granulomata which present many analogies both in the manner in which they begin, their subsequent behavior, and their pathological anatomy. The majority of them are inoculable, and may begin with a well-marked local lesion from which the general infection results. In many of them the virus retains its activity for long periods of time, and in certain stages producing lesions which are local rather than general.

This group of affections includes tuberculosis, leprosy, glanders, and probably mycosis fungoides and certain malignant tumors. As micro-organisms have been shown to be constantly present in the lesions of the first three named affections, and in all but leprosy proved to be their etiological factor, the conclusion is forced upon us that syphilis owes its existence to an analogous cause.

Although much painstaking labor has been devoted to efforts to discover the specific germ which we must believe causes the disease, up to this time no micro-organism has been found with sufficient frequency to enable

us to say that even the first condition in the chain of evidence has been complied with. The fact that lower animals can not be inoculated with syphilis, and that cultivations from syphilitic sores or from the blood during the active period of the disease yield no satisfactory or uniform results, render the study of its etiology extremely difficult.

Hutcheon has called especial attention to the points of resemblance which exist between syphilis and the acute exanthemata, in that a definite period of incubation in all these diseases is succeeded by symptoms of general infection, with an outbreak on the skin and mucous surface, and transitory congestions of various organs and tissues.

The partial or complete immunity which is conferred by the acute exanthemata and syphilis is another striking resemblance between them. It is also a noteworthy fact that in all these acute specific fevers, as well as in syphilis, in which immunity is conferred by one attack, the essential cause has eluded investigation.

MICRO-ORGANISMS IN SYPHILIS.

History.—While the claims made regarding the presence of micro-organisms in syphilitic lesions before the establishment of modern bacteriological methods have only a historical value, it is interesting to briefly note in chronological order what has been done.*

Donné (1837) observed in the secretions of chancre, suppurating buboes, and gonorrhœal pus the *vibrio lineola* previously described by Müller. He remarked, however, that its presence was probably accidental.

Hallier (Zeitschr. f. Parasitenkunde, p. 180, 1869) verified in the blood of syphilitic persons micrococci which resembled those found in patients with scarlatina. In the same and following years, Klotzsch, Salisbury, and Bruhlkens claimed to have seen spores in syphilitic blood and in the scales from syphilitic infiltrations.

Lostorfer (Archiv f. Dermat. u. Syphilis, 1872) excited considerable attention by claiming that he had found certain peculiar bodies in the blood of syphilitic subjects which had been kept for three days in a moist room. Wehl, Vajda, Neumann, Biesiadecki, and Köbner found similar bodies in the blood of healthy individuals as well as in those with syphilis.

It is now known that blood is an excellent culture medium, and that various micro-organisms from the air readily find a lodging place and rapidly develop in freshly drawn blood, so that any conclusions from these observations are entirely without value.

* For more complete historical references, see S. Lustgarten; Die Syphilis Bacillen, Wien, 1885; P. Baumgarten, Lehrb. der path. Mycologie, 1890; J. K. Proksch, Die Literatur über die venerischen Krankheiten, Bd. i; 1889, Contagienlehre; N. Senn, Surgical Bacteriology, second edition, pp. 240, 248, 1891.

Klebs (Archiv f. experim. Path. u. Pharmak., 1879, Bd. x) examined the fresh secretions from syphilitic sores and portions of excised initial lesions. He claimed to find cocci and short, thick bacilli, and also to have succeeded in making cultures of these organisms from syphilitic tissues on a solution of gelatin. A monkey which he believed to have successfully inoculated with syphilis subsequently died, and from its blood he obtained peculiar spiral-formed organisms which he looked upon as a new species and named "*Helicomonads*."

Bermann (1877), Culter (1878), Pisarewski (1880), Aufrecht (1881), Obraszow (1881), Birch-Hirschfeld (1882), Leistikow (1882), Martineau and Hamonic (1882), Morison (1883), Letnik (1883), Petrone (1884), Barduzzi (1884), and Tornery and Marcus (1884), describe organisms of various kinds in syphilitic products.

Martineau and Hamonic thought they had succeeded in inoculating pigs with a culture from an indurated chancre, and Cognard (1883) made a similar claim. Experiments with a like object in view by Köbner, Bayer, Horand and Cornevin, Neumann and Petrone, were without result.

This brief historical review of the work done previous to 1884 shows that the desired results were unsatisfactory and contradictory. No one succeeded in detecting a constant form of micro-organism in syphilitic inflammations; neither were the attempts to obtain cultures nor the inoculations of animals worthy of scientific consideration.

About the end of the year 1884, Lustgarten, in a preliminary communication (Wiener med. Wochenschrift, 1884, No. 47), announced that he had succeeded, by means of a special coloring method, in detecting bacilli in syphilitic tissue. Shortly afterward, in his second communication (Die Syphilis Bacillen, mit 4 Tafeln; Wiener med. Jahrbücher, 1885, Heft 1, page 89), he gives a more extended account of his investigations, and a detailed description of the bacillus and staining method.

Lustgarten's work excited general interest, and raised the hope that at last we were on the way to a more intimate knowledge of the etiology of the disease. The bacilli discovered by the coloring method in question differed from other similar organisms by their reaction to stains, and by their form and situation in the tissues. In size and shape they resembled closely the tubercle bacilli, but could be differentiated from these, the author believed, by their reaction to mineral acids, by the presence of knob-shaped swellings on their ends, and by the frequent appearance of bent and S-shaped forms. The syphilis bacilli were rapidly decolorized by nitric and hydrochloric acids, while the bacilli of tuberculosis and leprosy resisted the action of these acids much longer.

Staining.—*Lustgarten's Method.*—Sections cut as thin as possible are placed from twelve to twenty-four hours in Ehrlich-Weigert's solution of gentian-violet (concentrated alcoholic solution of gentian-violet

eleven parts, aniline water one hundred parts) at the ordinary temperature of the room, and finally the solution containing the sections is warmed for two hours at 40° C. The intensely colored sections are then decolorized as follows: They are placed for several minutes in absolute alcohol, and from this transferred to a one-and-a-half-per-cent solution of permanganate of potassium, where they remain for about ten seconds. Then the cuts are transferred to a freshly prepared watery solution of sulphurous acid, in which they partially or completely lose their color. From this they are washed in distilled water, and the procedure repeated several times until they are completely decolorized. The sections are now dehydrated in absolute alcohol, cleared in clove oil, and mounted in Canada balsam.

Cover-glass preparations are colored in the same manner, but washed in water, not in alcohol. The bacilli which were in this manner discovered by Lustgarten appear singly, and in groups of from two to eight, inclosed in cells double the size of white blood-corpuscles. They are especially apt to be found on the border line between the infiltrated and the sound tissue, but always in small numbers. Lustgarten examined sixteen cases in all, including initial lesions, gummata, lymph glands, moist papules, papules from the skin, and secretions from moist papules and initial lesions. In order to control the results obtained by his coloring method, he was not successful in staining bacilli and cocci met with in a variety of infectious and skin diseases. The examination of two soft chancre gave a negative result. Attempts to obtain cultivations were not successful.

In criticising Lustgarten's work, it should be borne in mind that although the author succeeded in demonstrating the bacilli in all the syphilitic tissues examined, they were present in extremely small numbers, many sections containing none, while in others one or more might be encountered after painstaking examination.

The coloring method is difficult, and, even after repeating the decolorizing procedure many times, portions of the dye remain which hinders the examinations. The small number of bacilli met with, even by the most experienced investigators, renders an examination to determine their presence or absence in the tissues a laborious and tedious undertaking.

The absence, as a rule, of giant cells in syphilitic tissue deprives one of the assistance rendered by these cells in tuberculosis and lupus as guides to the situation of the bacilli.

Other Staining Methods.—Shortly after the publication of Lustgarten's work and independent of it, Doutrelepont and Schütz, in an article entitled "Bacillen bei Syphilis" (*Deutsche med. Wochenschrift*, No. 19, p. 320, 1885), announced that they had demonstrated the presence of bacilli in syphilitic tissue by means of a special staining method, which in

form, size, and situation in the tissues corresponded to those described by Lustgarten, and were probably identical with them. Their method of preparing the sections is as follows: The tissues to be examined are cut in small pieces and hardened in absolute alcohol for several days. They are then softened for about ten minutes in water and cut with the freezing microtome. From the microtome the cuts are placed in a one-half-per-cent salt solution, and thereafter each section is carefully spread out in absolute alcohol, where they should remain until the air is expelled from them. The sections are now placed in a one-per-cent solution of gentian-violet for twenty-four or forty-eight hours. In decolorizing, each section is placed for a few seconds in diluted watery solution (one to fifteen) of nitric acid, and from this in sixty-per-cent alcohol, where after five or ten minutes the alcohol is deeply colored by the stain; it should be renewed at least once.

After decolorizing is completed, the cuts have a pale violet tint, and are now placed in a weak, translucent, watery solution of safranin, which should be freshly prepared each time it is used. Within a few minutes the sections are colored intensely red. They are then rapidly washed in sixty-per-cent alcohol, safranin stains are rapidly washed out by alcohol, dehydrated in absolute alcohol for a few seconds, cleared in cedar oil, and examined in Canada balsam by means of a Zeiss one-twelfth immersion lens. In this manner the authors found in two scleroses, two flat condylomata, a papule of the chin, and a gumma, the bacilli stained blue, and the tissues, especially the nuclei, stained pale red.

In a later communication Dautrelepoint (*Deutsche med. Wochenschrift*, No. 47, p. 812, 1885) reported that he had succeeded by means of his method in detecting the bacilli in syphilitic secretions, but not in smegma, although the bacilli in smegma were stained by Lustgarten's method. As a continuation of his former work he had found bacilli in eight scleroses of the prepuce, one of the vulva, one flat condyloma of the vulva, one condyloma about the anus, five syphilitic papules, and in one gumma.

De Giacomini (*Neue Färbungsmethode der Syphilisbacillen*, *Schweizer Correspondenzblatt*, 1885, p. 470) succeeded in revealing the bacilli in cover-glass preparations by means of a solution of fuchsin in aniline water heated over an alcohol flame; he used as a decolorizing agent at first a weak then a strong solution of chloride of iron. In this way the bacilli were stained red, while the other micro-organisms were decolorized; methylene blue was used as a contrast stain. The easy application of this method, as well as the short time required, recommend it.

Gottstein (*Referat über De Giacomini's Färbung der Syphilisbacillen*, *Fortsehr. der Med.*, 1885, No. 16, p. 545) applied the same method for coloring sections of syphilitic tissue. After remaining for twenty-four hours in the fuchsin solution they were washed in distilled water, then

decolorized in a weak solution of chloride of iron, dehydrated, and mounted in the usual manner. The sections should have a pale violet color and the cell nuclei be decolorized. Gottstein found with this method in almost every cut examined from two to twelve bacilli, either singly or in groups; in size and appearance they corresponded to those previously described.

Other micro-organisms, with the exception of the tubercle bacillus, were decolorized by the chloride of iron; the latter resisted its action for a period of twenty-four hours.

In a critical review of the work of De Giacomi and Gottstein, Baumgarten (*Jahresbericht über die Fortschritte in der Lehre von den pathogenen Mikroorganismen*, 1885, p. 97) stated that he had readily succeeded in detecting bacilli in an initial lesion by means of this procedure, while by the Lustgarten method he had searched in vain for organisms.

The specific claims for the bacillus of syphilis received a severe blow when Cornil (*Gaz. des Hôpitaux*, 1885, No. 90), in a communication to the Academy of Medicine of Paris, stated that Alvarez and Tavel had found in the smegma taken from a healthy man bacilli which reacted in the same manner to aniline dyes, and were in every respect identical with the Lustgarten bacilli.

The complete article by Alvarez and Tavel (*Archives de Physiologie*, October, 1885) contains a critical review of Lustgarten's work, as well as the results obtained from the examination of a number of cases of syphilitic tissue and secretions, as well as the non-specific products. These authors obtained a negative result from the examination of five scleroses, two mucous patches, and a gumma of the lungs, but found the organisms in the secretions from chancre, gummata, mucous patches, as well as in three cases of soft chancre, out of twelve examined, in the fluid of the vesicles of herpes præputialis, and in pemphigus vulgaris. In the smegma taken from the prepuce, from between the large and small lips of the vulva, and from the region of the anus, the same bacilli were found identical in appearance and color reaction with the bacillus of Lustgarten, and very similar to the tubercle bacillus.

The bacilli were stained in two hours with a constant temperature of 60° C. With eosin, safranin, and picrocarmine good contrast colors were obtained. Oxalic acid was used instead of sulphurous acid with much the same result. In their reaction to acids they showed a great resemblance to the bacilli of tuberculosis, as they were not decolorized by a thirty-three-and-one-third-per-cent solution of nitric acid. Cover glass preparations were stained with good results by means of a solution of fuchsin in aniline water, decolorized with nitric acid and counter-stained with methylene blue.

A short time after the appearance of the publication last named,

George Klemperer, at a meeting of the Berlin Medical Society (Deutsche med. Wochenschrift, No. 47, 1885), confirmed in great measure the results attained by the French investigators. He found, however, that the smegma bacillus was much more easily decolorized by acids than the bacillus of tuberculosis. While successful in demonstrating bacilli in the secretions from syphilitic lesions, he failed to find them in the tissue of specific products.

Before the publication of the work of Lustgarten, as well as that of Doutrelepont, Matterstock and Bitter (Mittheil. ans der Klinik der Universität Würzburg, Wiesbaden, 1886, Bergmann) had by means of aniline dyes demonstrated bacilli in initial lesions and in condylomata; they were present in such small numbers that the authors could not look upon them as the cause of the disease. They continued their investigations with the coloring method of Lustgarten and found bacilli in two scleroses, two papules from the leg, seven flat condylomata from the female genitals, and in four gummata from the skin. The same organisms were detected in the secretion from various specific lesions, with the exception of gummata, and of the blood taken during the existence of a roseola syphilitica. They agreed with Alvarez and Tavel in discovering no difference in staining reaction between the smegma and syphilis bacillus, although both resisted the influence of the mineral acids a much shorter time than the bacillus of tuberculosis. They were disposed to assign an etiological rôle to the bacilli, in spite of their resemblance in appearance and color reaction to the smegma bacilli.

Bitter (Virchow's Archiv. Bd. cvi, H. 2), under the direction of Matterstock, continued the investigation with especial reference to the color reaction. He found, after staining by Lustgarten's method, that the preparation could not remain for a longer time than thirty seconds in alcohol without losing its color. He also found it necessary to frequently pass the sections through the permanganate of potassium and sulphurous acid before they were entirely decolorized. He furthermore remarks that the question of a differential diagnosis of the tubercle and smegma bacillus could only come into consideration in the examination of urine, as, in secretion removed at a distance from the genital organs, one would not expect to encounter the latter organism.

Zeissl (Wiener med. Presse, 1885, No. 48) examined nine scleroses and one moist papule with a practically negative result, as bacilli were found in only two sections. In the secretion of syphilitic products the result was not always positive.

J. Dissé and K. Taguchi (Tokio) in a preliminary communication (Deutsche med. Wochenschrift, 1885, No. 48), and later in a more detailed account (Deutsche med. Wochenschrift, 1886, No. 14), affirmed that they had encountered a constant form of organism in all syphilitic prod-

uets, cultivated it, and successfully used the cultures in inoculation of rabbits, who later developed characteristic specific lesions. In the blood taken from syphilitic individuals, round spores were encountered after the use of Gram's staining method, and in cultures obtained from such blood they found several distinct bacilli. A bacillus identical with one of the forms detected in the cultures was also found in the secretions from chancre and flat condylomata, and in the blood and urine of animals inoculated with these cultures.

It is manifest from the claims of these authors that they were able by a well-known and comparatively easy coloring method to reveal the presence of organisms which had escaped other skilled observers, that their cultures were obtained without especial precautions, and that they succeeded in producing in animals specific lesions.

In opposition to the claims set up by Dissé and Taguchi to have succeeded in infecting rabbits, it may be said that the initial lesion was absent, that pathological changes in the internal organs appeared in a relatively short time after the infection, and, furthermore, that organs were found affected in these animals which are seldom found diseased in man. It is probable that all these changes can be referred to septic or other infection, and not to the influence of syphilis. The organisms described by these writers were subsequently found in the blood of healthy individuals by Steingiesser, working under Lassar's direction, and from cultures made with such blood rabbits were inoculated. Although large numbers of organisms were found in the blood of such inoculated rabbits, no change took place in their appearance or behavior.

Eve and Lingard (On a Bacillus cultivated from the Blood and from Diseased Tissues in Syphilis; *The Lancet*, No. xv, 1886, vol. i) believe, as a result of their successful examination of initial lesions, syphilitic buboes, condylomata, for bacilli, as well as from cultures obtained from blood and syphilitic secretions, that they have discovered the true cause of the affection. Their bacillus is about the size and shape of that of tuberculosis. It was found abundantly on the line between the healthy and diseased tissue in scleroses, seldom in the granulation tissue of ulcers. They encountered it in lymph glands, partly within and partly without the cells, in condylomata, both on the surface and in the corium, and in gunmata of the skin at the line of infiltration when the process was extending. The best staining method was a solution of Humboldt-red in aniline oil and decolorizing in alcohol. Gram's method was also successful, though the bacilli were decolorized by acids as also by Lustgarten's method. Successful cultures were obtained upon blood serum, agar-agar, and hydrocele fluid. Attempts to inoculate animals failed.

Further investigations have been made regarding the bacterial origin of syphilis by Markuse (*Vierteljahresschrift f. Dermat. n. Syph.*, 1888),

who obtained a positive result in ten of twenty-three chancres examined, and in forty-three of fifty-seven anal condylomata. From a number of experiments, he concluded that the smegma bacillus resisted the action of acids for a considerably longer time than the syphilis bacillus.

Andromico, Haberkorn, Marcus, Manssurow, Leloir, Babes, Königer, and others describe organisms from the blood and secretions of syphilitic subjects to which more or less etiological importance has been assigned.

The writer of this paper, in the laboratory of Dr. Lassar, of Berlin (Inaugural Dissertation, Universität zu Berlin, 1888), repeated many of the staining methods previously mentioned, notably those of Lustgarten and Doutrelepon, and was successful in obtaining positive results in two scleroses and one flat condyloma out of a number examined by these methods. He was more successful in demonstrating bacilli in specific lesions by a coloring method which had been devised by Kühne a short time previously (Ueber ein combinirtes Universalverfahren Spaltpilze im thierischen Gewebe Nachzuweisen; Unna's Dermatologische Studien, Heft 2). A flat condyloma stained in this manner contained bacilli in almost every section examined; in one section a group of twenty bacilli were found in the subcutaneous cell infiltration, crossed, parallel, and arranged in chains of twos and threes. In sections from pointed condylomata examined in the same manner no bacilli were encountered, but numerous cocci on their surface.

From the foregoing it will be seen that, although the results obtained were not uniform nor always of a positive character, the presence of bacilli in syphilitic tissue can not be doubted. Their small number in such highly infectious lesions as chancres and mucous patches speaks against their etiological relationship to the disease unless the coloring methods are at fault. It is possible, as suggested by Lustgarten, that the bacilli are only capable of taking up the stain during a short period of their existence. As a rule, the spores of all micro-organisms take the aniline dyes with difficulty, if at all; and it is known that in certain tubercular lesions their specific nature can only be demonstrated positively by cultures and inoculation experiments. In the case of syphilis, a disease confined to the human race, we would scarcely expect to succeed in growing the microbe upon artificial media when animals prove refractory to inoculation attempts.

Although so many important conditions are lacking to prove that syphilis is caused by the bacillus of Lustgarten, it is the opinion of many competent syphilographers that, owing to its presence in all syphilitic lesions, especially those at a distance from the genitals, it must have some etiological connection with this disease in spite of its close resemblance to the bacillus of smegma. Baumgarten, who is opposed to ascribing much importance to the presence of the bacillus in the lesions of internal

organs, is inclined to identify it with the bacillus of tuberculosis rather than with the smegma bacillus. Some additional support is given to this view of Baumgarten's by the recent work of Sabouraud (*Quelque faits relatifs à la méthode de coloration de Lustgarten*, *Annales de l'Institut Pasteur*, Mars, 1892, p. 184), who found the coloring method of Lustgarten a very excellent way to stain tubercle bacilli. Bacilli were detected in a lesion at first looked upon as a gumma, but its tubercular nature was determined by inoculations of animals. It is known that syphilis is not infrequently responsible for the development of a latent tuberculosis, and it is possible that many apparently healthy individuals carry with them more or less tubercle bacilli which are stimulated to development by the syphilitic poison, and constitute a source of confusion in our staining methods.

This latter view is upheld by the late work of Pizzini (*Zeitschr. für klin. Med.*, Bd. xxi, No. 329), who succeeded in producing tuberculosis in guinea-pigs by inoculating them with lymph glands from persons who had died of acute diseases, but without evidence of tuberculosis.

The points of similarity which exist between syphilis and the acute exanthemata have already been referred to. The failure to demonstrate the essential nature of the contagion of these affections has led Koch to the opinion that perhaps not a bacterium, but a protozoön, was responsible for their production.

Last year (1892), Daehle (*Centralbl. f. Bakt.*, Bd. xii, No. 25) claimed to have demonstrated in the blood of cases of variola, measles, and scarlatina, in the pustules of variola, and in various syphilitic secretions, parasitic protozoa, probably in the case of the acute exanthemata allied in species. He has not determined the special group of protozoa to which the present organisms belong. They have the form of flagellate balls of various sizes, one to two and a half microns in the case of the acute affections, and a half to four microns in the case of syphilis; they possess active movement and changes of shape.

Daehle states that he has been able to cultivate the organisms found in scarlatina and variola, and promised more details in a later communication.

The growing importance at present assigned to the existence of protozoa in malignant growths and in certain cutaneous affections, together with the great activity in this field of research, renders it probable that the future will clear up many obscure points in the etiology of certain affections in which the better known vegetable organisms have not been found.

Secondary Infection of Syphilitic Lesions with Pyogenic Organisms.—Kassowitz and Hochsinger, in 1886 (*Wiener med. Blätter*, 1886, Nos. 1-4), by a modification of Gram's method, discovered cocci in

pemphigus bullæ, the bones, liver, pancreas, and lungs of children who had died with hereditary syphilis. These cocci were present in organs with microscopic or macroscopic syphilitic lesions, and not in non-syphilitic children. The authors, while not claiming that these microbes were the cause of syphilis, were yet inclined to attribute to them an etiological importance.

Kolisko (Wiener med. Blätter, 1886, No. 5), in repeating the examination made by the last-named writers, admitted that the cocci were often found. He obtained in one case a pure culture of the streptococcus pyogenes from blood taken from the liver. This writer believed the organisms in question gained an entrance into the circulation through the skin lesions, and, while attributing to them no importance in the production of the disease, thought the fatal termination in many cases of hereditary syphilis depended upon the septic influence of these microbes.

Chotzen (Vierteljahr. für Dermat. u. Syph., 1887, p. 109) expressed a similar opinion, and was inclined to believe that the presence of the streptococcus was accidental, and not at all an essential condition of hereditary syphilis. Its presence in the epiphyseal extremities of the long bones in children led him to believe that the frequent occurrence of lesions in these localities might be explained by this fact.

Doutrelepoint (Centralblatt f. Bact. u. Parasitenkunde, B. ii, No. 13) agrees in the main with Kolisko and Chotzen regarding the nature of the streptococcus. He has found it in papular skin eruptions, and thinks it may gain entrance into the general circulation through these lesions. He would attribute the suppuration in bones and other organs met with in children with hereditary syphilis to a secondary infection from this organism.

The writer of this paper has examined skin lesions, the umbilical cord, and sections from the liver of children in whom death resulted from hereditary syphilis, and has easily demonstrated the presence in large numbers of pyogenic micrococci. He is disposed to believe that secondary infection by these organisms plays an important rôle in many complications of the hereditary affection, and determines in certain instances the fatal result.

As the specific lesions in acquired syphilis seldom suppurate, many modern writers believe that the exceptional occurrence of suppuration is determined not so much by the direct action of the virus of syphilis as by a secondary or mixed infection with pyogenic germs which are incited into activity by the impairment in the integrity of the tissues through the specific lesions.

The fact that gummata of the skin and subcutaneous tissue suppurate much more frequently than similar lesions in internal organs; that pustular lesions are seen more often among those in the lower walks of life

where less attention is paid to personal cleanliness, and on the scalp and hairy regions of the body where pyogenic germs find a more permanent lodging place, are additional arguments in favor of the admixture of the pus-producing organisms with the specific poison of the disease. A more intimate knowledge of the microbe causing the disease, together with the action of its ptomaine, may alter our views in regard to the cause of suppuration in syphilis.

As secondary and mixed infections play so important a rôle in other infectious diseases, it would be exceptional where so many foci of absorption and infection are afforded as in syphilis, should all the sequences of the disease be due to a single germ.

The presence of pyogenic cocci below the healthy epidermis, as shown by Welch and others, renders the theory of secondary infection in many specific lesions extremely probable. The simultaneous outbreak of a pustular syphilide over the entire body speaks against the theory of a local infection of the specific lesions, and rather in favor of a poison in the general circulation.

It is known that suppuration may be excited by a variety of bacteria and by their filtered soluble products, and that the same organism under different conditions undergoes modifications which greatly alters its pathogenic power. Cultures of streptococci vary in virulency according to the source from which they are derived, and the bacillus of tuberculosis produces cutaneous lesions and lesions of the mucous membranes, which are distinct in their clinical appearances and subsequent course. A tuberculosis of the mucous membrane of the mouth or throat inoculated by the bacilli in the sputum is clinically a different affection from a slowly progressing lupus of the same locality or of the skin, though we ascribe both to a common cause.

In the one instance we suppose that the bacillus, direct from active disease of the lungs, contains its chemical poison in a more concentrated form than the same organism in lupous tissue; just as streptococci from the fluid in a septic peritonitis are infinitely more virulent than the same organism found in acne pustules.

It may then be assumed that the toxine which we must believe to be associated with the micro-organism causing syphilis has, in these cases of early pustular and ulcerative lesions—the so-called malignant precocious syphilides—acquired an increased virulence capable in itself of producing suppuration or of inciting into activity the pyogenic organisms normally inhabiting the epidermis.

It is possible that the union of various bacteria in the initial lesion may generate a more virulent form of toxine than a single variety.

Undoubtedly predisposition, the quality of the soil, a partially acquired immunity, may influence the intensity of the manifestations of

the disease; but we can scarcely explain all its manifestations on these assumptions.

The growing importance assigned to the waste products of bacteria in the production of many of the phenomena of the infectious diseases has led Finger (*Archiv für Dermat. u. Syphilis*, p. 331, 1890) and others to the belief that in syphilis certain manifestations may be assigned to the direct action of the microbes themselves; while others depend upon the action of a toxalbumen generated by the specific bacilli.

The differences presented in the clinical behavior of the early and late syphilitic manifestations, together with the unequal reaction of the lesions of the different stages to therapeutic measures; the immunity acquired by mothers who bear syphilitic children from the father, and of children born healthy and remaining so of syphilitic mothers, are facts which point strongly to the view that we have to do with complicated factors in the etiology of this disease.

Until, however, we become more intimately acquainted with the life history of the micro-organism which causes syphilis, and can separate in an experimental way the effects produced by the germ itself and those resulting from its chemical poison, we are obliged to apply the pathological laws governing other infectious diseases in explaining the phenomena of syphilis.

In Finger's article (*loc. cit.*), which is of course founded upon hypothesis and analogous reasoning, he points out the effects which we may assume to be due to the action of the micro-organism itself and those produced by its chemical product.

The initial lesion with the involvement of the neighboring lymph glands he considers to contain both the specific germ and its ptomaine. The latter, absorbed into the general circulation from early date, produces the immunity which syphilitic infected persons usually present from an early period and long before the outbreak of secondary eruptions.

The fever, anæmia, loss of strength, passing icterus, albuminuria, the pains in the muscles, joints, and bones, the loss of hair, and lusterless and brittle condition of the nails met with in the primary and secondary stages of the disease, are to be referred to a progressive intoxication from the chemical products generated in the initial lesion and lymph-glands, rather than to the direct irritating action of a living germ.

Secondary Syphilis.—The secondary eruption, containing in a highly active state the contagious principle, must be regarded as the direct product of the micro-organism alone or combined with its toxine. Certain cases are characterized by intense disturbance in the general health, with slight eruptive manifestations.

In these patients we may conceive that a more poisonous toxine is produced, or a less tolerant condition of the tissues is present.

The facts which we have gained regarding the establishment of immunity in infectious diseases have rendered it pretty clear that such immunity depends upon an acquired tolerance to the toxic products of pathogenic bacteria. A complete or partial immunity results from a single attack of the acquired disease.

Mothers who bear syphilitic children from latent syphilitic fathers escape the disease entirely, or pass through a modified form of it (Colles-Baumès law). Children born from mothers infected directly during pregnancy as a rule are born healthy, and remain during life protected against the disease (Profeta's law).

Although it is not impossible, as at one time supposed, for micro-organisms to pass from the fœtus into the maternal circulation, and *vice versa*, it is probably true that the passage of the crystalloid toxins, generated by the development of the specific microbes in slowly increasing quantities, is responsible for the production of the immunity of the mother in the one case and of the child in the other.

Some writers have attempted to explain the fact that syphilitic children are not infrequently born without evidences of the disease, but later show marked impairment in their general health, develop an eruption, or other evidences of the affection, on the supposition that during intra-uterine life the toxins are escaping by osmosis into the maternal circulation, and are not stored up in the fœtal tissues. At birth an accumulation of these poisonous bodies takes place, which soon produces characteristic effects in the delicate organism of the child.

When syphilis is present in the mother as well as in the child, of course the elimination of toxins would be markedly prevented, and death of the *fœtus in utero* would be likely to occur, or the child be born with the disease fully developed.

These hypotheses serve to explain the phenomena of the acquired as well as the hereditary form of the disease, and have in their support much experimental evidence connected with the inoculation of animals with the infectious diseases.

Tertiary Syphilis.—Finger (*loc. cit.*) believes that the late manifestation of syphilis, like the immunity conferred by the disease, is the result of the action of the toxins. His reasons for this belief are: The exceptional occurrence of tertiary manifestations, their late appearance after infection, their different clinical appearances and course, the fact that they are neither contagious nor transmitted by inheritance, and that in this stage reinfection is possible; the essentially different results obtained in the early and late lesions from the administration of the iodides; finally, that, like immunity, individuals may present tertiary lesions who have passed through neither the primary nor secondary stages of the malady.

This last proposition is illustrated in the mothers who bear children from syphilitic fathers. While they are not inoculated by the active contagious lesions which their children may present, it is not unusual later in their lives for them to develop a caehexia or tertiary lesion.

Predisposing Causes.—Independent of the virulency or attenuation of the virus of syphilis in the production of a severe or mild type of the disease, the *resisting power of the individual* upon whom the poison is inoculated probably plays a no less important rôle in its future evolution.

All conditions producing constitutional weakness, such as acute or chronic diseases, the extremes of life—youth and old age—tuberculosis, malaria, alcoholism, etc., render it probable that the disease will pursue a severer course.

The presence of *tuberculosis*, while in itself predisposing to a graver form of syphilis, prevents in a measure the use of mercury, and thus deprives us of our most useful therapeutic agent.

Syphilis not infrequently develops a latent tuberculosis of the lymph-glands or of the lungs in individuals apparently in good health before their infection.

Malaria.—The caehexia resulting from a prolonged residence in a malarious locality has sufficed to cause an outbreak of the inactive syphilis. The well-known influence of *chronic alcoholism* in increasing the vulnerability of the tissues in all infectious diseases seems to be intensified in syphilis, for it is generally accepted that the prognosis in such individuals is much more grave than in temperate persons. Whether by increasing the vascularity of the parts a more favorable soil is furnished for the growth of the disease germs, or, by the conjoint action of both agents upon the lining membrane of the blood-vessels, for which they have a predilection, a more rapid and serious pathological effect is produced, are questions which, in our present knowledge, can only be answered in a general way.

Localization.—Syphilis in some instances displays a preference for certain tissues, in one case confining its manifestations to the skin, in another to the osseous system, and in a third implicating the nervous centers alone.

Chance seems, in the great majority of instances, to govern the situation of syphilitic lesions; while, again, prolonged irritation, injuries to certain organs, or the *locus minoris resistentiæ*, may be invoked to explain their location.

The occurrence of late lesions at the sites of the early eruptions would point to a persistence of the virus in one locality. Neumann's histological examination, showing pathological changes in tissues formerly the seat of the eruption, but macroscopically normal, would lend support to this view.

The influence of heredity, with mental overwork and worry, have been offered by certain French writers as potent factors in rendering the nervous centers more susceptible to the disease. This explanation would seem to have some weight, in view of the fact that general paralysis of the insane occurs among those individuals exposed to much mental worry, and that seventy-five per cent of such patients have had syphilis.

Improper or imperfectly carried-out treatment during the early stage of the disease is the most frequent cause of the occurrence of tertiary symptoms, as shown by the statistics of Haslind and others; while the causes before mentioned apply to the minority of cases only.

Immunity through Syphilization.—Aside from the factors which influence the severity of the syphilitic infection in a general way, an attempt has been made to explain the occurrence of malignant syphilis by supposing that the virus inoculated on such individuals is more virulent, or has been imported from another latitude or race. This explanation will not always hold good, however, as observations have been made which show that malignant syphilis when transferred to others pursues an ordinary benign course.

Taking into consideration the fact that infectious and contagious diseases show a tendency to grow milder after existing for a time in a community, the occasional outbreak of the malignant type of the disease has been explained by supposing that its victim belongs to a family which has not acquired a partial immunity through the syphilization of any of its members.

When we compare the milder course of the affection to-day with the severe epidemic at the end of the fifteenth century, this explanation would seem to possess some other merit than hypothesis pure and simple.

SOURCES AND VEHICLES OF THE SYPHILITIC CONTAGION.

Unlike the virus of the acute contagious diseases, the poison of syphilis adheres closely to the specific lesions or infected objects, and requires an intimate contact with an abraded surface or delicate mucous membrane to gain an entrance into the tissues.

It has been recognized for a long time that the *initial sclerosis* contains the syphilitic poison, and that it can be conveyed to the healthy both by direct or mediate contact, as well as by experimental inoculations.

The opinions in regard to the infectious nature of the *secondary lesions* and the blood at this period of the disease were at one time not so unanimous. Both Hunter and Ricord, as the result of theoretical considerations and experiments, denied the infectiousness of all syphilitic products excepting the initial lesion. The fallacy of their conclusions, however, depended upon the fact that their inoculations were made upon patients who were already syphilitic, and not upon healthy subjects.

Wallace, of Dublin, in 1835, first showed that the secretion from *sypilitic pustules* could produce the disease by inoculation, and alluded to the successful experiments with the secretion from flat condylomata made by another investigator.

Waller, of Prague, in 1851, inoculated the secretion from a *flat condyloma* upon the thigh of a boy, and produced, after twenty-five days, typical initial lesions, followed after due time by a secondary eruption.

Experiments with identical results have since been made by Vidal, Rinecker, Hebra, Rosner, and a host of others, proving the contagiousness of the products of the early syphilitic lesions which the confrontations of Bassereau, Diday, Fournier, Clerc, and others, together with numerous further experiments and observations have confirmed, so that now it is well established that all syphilitic forms belonging to the early period of the disease, especially their secretions, can communicate the affection. The secretion from the abraded condylomata lata which are present about the female genitals is believed to be the most frequent source of syphilitic infection. Successful inoculations with the *blood* of patients with active secondary syphilis have been made by Waller, the anonymous physician of the Palatinate—who applied such blood to patients with ulcers of the leg and caused constitutional infection in three instances without reaction at the point of inoculation—also by Diday, Von Lindwurm, and Pellizzari. In Von Lindwurm's experiment the blood was injected beneath the skin by means of a Pravaz's syringe, and caused four weeks afterward an indurated sore at the point of injection, which was later followed by the usual signs of constitutional infection.

As, in the instances quoted, the blood was taken from patients in the early eruptive period of the disease, it is not yet established whether the poison is present in the blood of individuals with latent syphilis—that is, in the intermediate periods between the outbreaks on the surface. It is the opinion of Finger and others that the blood at such times is free from the virus, and that it may again be present during the relapses of the disease. There is nothing irrational in this view, when we remember that in relapsing fever the spirillum is constantly present in the blood during the fever, and absent in the intervals.

Physiological Secretions.—It is generally asserted that the physiological secretions—milk, saliva, perspiration, tears, and urine—from syphilitic persons do not contain the virus, or in such a diluted form that infection from them is not possible. We now know that the micro-organisms of various infectious diseases may pass through the glandular epithelium and appear in the saliva, milk, urine, etc., so that the possibility of transmitting syphilis by such secretions is not absolutely excluded.

Zeissl has observed the development of condylomata upon the lips of infants nursed by women with latent syphilis. Voss claimed to produce

the disease in one instance by the subcutaneous injection of *milk*; and, Mansserow (1887) believes that the milk of latent syphilitic nurses may be infectious.

Many instances are, however, on record in which nurses with latent syphilis suckled healthy children without infecting them. The weight of evidence is against the infectiousness of such milk, although the possibility of it should not be lost sight of. Tarnowsky quotes from Bertin a case where a healthy mother nursed her own child for a number of months. By chance she suckled another child with mucous patches in its mouth. After eight days her own child presented a chancre, followed by constitutional syphilis. The mother during the entire time remained healthy. Accidental inoculation of the disease occurs so frequently that too much care can not be exercised in drawing conclusions regarding the source of the infection.

Experimental inoculations of *semen* from syphilitic persons on the healthy have given only a negative result. It has been claimed that a syphilitic man can infect his wife without conception through the direct action of the spermatic fluid. It is the general belief that such infection can not take place unless the semen be mixed with syphilitic virus from the urethra. The hereditary transmission of the disease from the father to the child by means of the semen, without a previous infection of the mother, is generally admitted. In such instances, however, the infection of the ovum by the spermatozoön is quite a different process from artificial inoculations, and can not be compared to them.

The transmission of syphilis from the mother to the child by means of the *infected ovum* is also an established fact. In this case an ovum which has imbibed the poison from the maternal organism is impregnated with healthy semen.

Whereas the capability of transmitting the disease on the side of the father ceases within two to four years as a rule, with the mother this possibility continues for a longer time.

Pathological Secretions.—Regarding the infectious property of pathological secretions not properly belonging to syphilis, it is generally stated that the disease can not be conveyed by them unless they are mixed with the patient's blood or disintegrated portions of specific lesions. Diday inoculated pus from an acne pustule on a syphilitic individual produced by iodide of potassium with a negative result. A like result was obtained after the inoculation of serum from a case of eczema taken from a patient with syphilis.

Gonorrhœa or chaneroid contracted from a person having at the same time syphilis, is, as a rule, followed by no constitutional infection.

Berkeley Hill, and Marston are of the opinion that blennorrhagic discharges may infect with syphilis. Tarnowsky made eighteen inoculations

with gonorrhœal pus from the genitals of syphilitic patients, with one positive result only.

It should be borne in mind that with the outbreak of early secondary syphilis a slight urethral or vaginal discharge may occur, due to the presence of local lesions, or as a part of the general congestion of the mucous membranes, capable in itself of conveying the disease.

In vaccinal syphilis, the view generally held is that when pure lymph is inoculated with no admixture of blood *vaecinia* alone is transmitted, and no syphilis.

In the instances of claimed inoculation with pure lymph taken from a vaccine vesicle on a syphilitic person, the possibility of a contamination with blood-corpuscles was not excluded by a microscopie examination.

Experimental inoculations made with the secretions from *tertiary lesions* on healthy subjects have invariably given negative results. Diday made sixteen inoculations with blood from patients with late syphilis without conveying the disease.

Finger inoculated the secretion from gummata of the skin, late ulcerations of the mucous membranes, and from patients with periostitis, thirty times on ten healthy subjects, with no positive results.

It is yet an open question whether the secretion from the precocious ulcerating lesions is infectious.

The result of the inoculation experiments is in accordance with everyday experience which teaches us that the late lesions are, as a rule, neither inoculable nor transmitted by inheritance, and that such patients may acquire a syphilitic reinfection. The views regarding the infectiousness of the late lesions of syphilis must not be taken too absolutely, as a number of good observers have reported instances both of inoculation and hereditary transmission of tertiary syphilis.

As at one time the infectiousness of the secondary lesions of syphilis was strongly denied, a wider experience and more careful observation may to some extent alter our views regarding the infectious character of the tertiary products. At the meeting of the International Congress of Dermatology and Syphilography held at Paris in 1889, Landouzy read a paper in which he related two instances where recently married husbands infected their wives long after the secondary period of the disease had passed. In one case the husband had a gummatous lesion on the penis, the diagnosis of which had been confirmed by Fournier. His wife, a few months after marriage, developed a syphilitic roseola preceded by inguinal adenopathies.

In the other case four years had elapsed since the appearance of the initial lesion on the husband. He had been repeatedly treated with mercury and iodide of potassium, and when married had no evidence of the disease either on the skin or mucous membranes. Several weeks after

marriage, however, his wife developed a chancre of the vulva, followed by the usual evidences of constitutional infection.

In the discussion which followed the reading of this paper a number of gentlemen present recalled similar instances.

Hardy expressed the belief, founded on the observation of two cases, that syphilis might be transmitted independent of all outward signs of the disease.

Fournier related a case in which a husband infected his wife fifteen years after he contracted the disease. At the time the patient suffered from pulmonary syphilis, together with a sclerotic glossitis. The wife developed a chancre of the lip, which was followed by a secondary rash. We must in all such cases remember the possibility of some other source of contagion.

SYPHILIS IN ANIMALS.

The remarkable progress made in the study of tuberculosis has been owing to the susceptibility which animals show to that affection. Unfortunately for the scientific study of the etiology of syphilis—a disease even more infectious than tuberculosis—our investigations are sadly impeded by the immunity which animals of all classes have shown to this disease.

Hunter made the first attempt to inoculate animals with the venereal diseases, and mentions inserting lint saturated with pus from gonorrhœa, chancre, and buboes, into the vaginas of dogs and asses.

These efforts to communicate the venereal diseases to animals, as well as subsequent experiments in a like direction by Ricord, were without result.

In 1844, Auzias-Turenne claimed to have infected a monkey with syphilis. As he was a unicist of the first order, the lesion produced was probably a pustule, regarded by him as an evidence of syphilis.

The same investigator inoculated a cat with syphilis, and describes certain general manifestations of constitutional infection aside from the local lesion.

The results were not accepted in his own day as positive, as the experiments were not carried out with scientific accuracy.

In 1871, S. Messenger Bradley reported at a meeting of the British Medical Association that after a number of attempts at inoculating animals which had been without result or produced soft sores only, he had successfully infected a guinea pig and young kitten with the disease.

“The inoculation was followed, in from two to three weeks, by a local thickening at the point of inoculation, and afterward by constitutional syphilis. The guinea pig died within one month from the commencement of the induration, with destruction of one eye, and extensive destruction

of the mouth and soft palate. I killed the kitten at the end of the eighth week, and found syphilitic gummata in the kidneys and liver."

In these cases, which seem somewhat plausible, the results have been accepted by some writers on syphilis as proving the possibility of infecting the lower animals.

In neither of the cases, however, was the probability of a tubercular or septic infection excluded.

In 1874, Legros inserted a piece of indurated chancre under the skin of a guinea pig. After a time an ulcer with an indurated base developed.

During the healing of the wound the animal died, and at the autopsy the lymphatic glands and liver were found enlarged. Small tumors were present in the substance of the liver, together with cicatrices upon its surface. A small yellow nodule, the size of a pea, was found in one epididymis.

In view of the predisposition of guinea pigs to tubercular infection, there can be little doubt that Legros's case was of that nature. We would not expect to find such lesions in syphilis at so early a date after infection.

In 1882, Martineau and Hamonic inoculated a monkey on the penis with the secretion from a true chancre. After twenty-eight days two indurated nodules appeared on the prepuce, followed by an enlargement of a lymphatic gland in the left groin. The sores healed, but a general adenopathy, papulo-erosive lesions on the prepuce, ulcerative lesion of the soft palate, and papular eruption on the scrotum developed.

Subsequently the animal became quite well.

The development of the affection in this case certainly suggests a successful syphilitic inoculation.

Köbner (Wien med. Wochenschrift, 1883, p. 898) discussed at length the question of conveying syphilis to the lower animals, and recalled certain experiments made by himself in 1861 in the laboratory of Claude Bernard.

He inoculated rabbits and dogs in the cornea with the secretion of mucous patches. He injected in the veins of the animals the same secretion, the fluid expressed from chancres freshly extirpated, and by other methods endeavored to convey the disease. Neither local nor constitutional infection was produced.

Neumann, in 1883, inoculated a large number of animals, including three monkeys and two horses, but failed in every instance to reproduce the disease.

Horand and Cornevin were equally unsuccessful in their attempts to inoculate pigs.

Cognard claimed to have successfully reproduced syphilis in a monkey. In discussing his communication, Dron and Horand believed

the monkey to be affected with a form of septicæmia, as the animal became ill after the inoculation and developed an ecchymatous eruption.

The strong probability that many of the lesions following inoculation of syphilitic matter in animals were tubercular, is strengthened by the experiments of Vittone in 1884, who demonstrated the bacillus of tuberculosis in lesions of the eye, lungs, and peritonæum following the inoculation of syphilitic secretions beneath the conjunctiva of rabbits and other animals.

Although we can not absolutely deny the possibility under favorable conditions of infecting the lower animals with syphilis, the attempts thus far made are not encouraging, and the results, even in the apparently successful instances, should be accepted with the greatest reserve.

The future work in the etiology of syphilis must be directed to devising some staining method which will reveal the constant presence of the micro-organism in the products of the disease, and a culture medium upon which it will grow. When these conditions are complied with, opportunities may be afforded for inoculations which will conclusively demonstrate its etiological relationship to the disease.

MODES OF INFECTION IN SYPHILIS.

By L. DUNCAN BULKLEY, M. D.

SYPHILIS is communicated from one individual to another by the transference of the virus or contagious element peculiar to the disease. It can never arise *de novo*, but in every instance is propagated in a definite manner, which could always be determined if all the facts relating to each case were known and correctly observed. It is never acquired in any occult manner—by the breath, or by mere proximity to an affected individual—unless there has been an actual transference and absorption of the contagious element of the disease.

There are four methods by which syphilis can be acquired: 1. Direct Contact. 2. Mediate infection. 3. Hereditary transmission. 4. Maternal infection. It is not believed that the normal secretions—milk, saliva, etc.—can communicate the disease, except when they act as carriers of a pathological secretion from a syphilitic lesion.

For the entrance of the syphilitic poison through the skin or mucous membrane, either by direct contact or by mediate infection, there must be a solution of continuity of the epithelial covering, the broken or abraded surface occurring either at the time of infection or previously; at the site where this entrance of the poison takes place there occurs a chancre, primary lesion, or local lesion of syphilis, which is described in another chapter. In hereditary transmission and maternal infection the poison is conveyed by the semen, and in the latter instance enters through the uterine walls, and no primary local lesion is known to occur.

I. Direct Contact.—By far the greatest number of instances of syphilitic infection occur from direct contact, and of these altogether the largest proportion come from *direct venereal contact* in the genital region. The explanation of this is readily found in the delicate character of the mucous membranes of the parts, and the frequent abrasions which occur during coitus, together with those arising from herpes, eczema, or other conditions; the absorption is specially favored by prolonged contact, and heat and moisture. Venereal infection also takes place not infrequently by unnatural practices, giving rise to chancres of the anus, beneath the breasts, and also in the mouth, on the tongue, lips, tonsils, etc.

But in addition to *venereal contact of the sexual organs* there are a large number of occasions wherein the syphilitic poison is transmitted directly; these may conveniently be studied under, (1) buccal contact, (2) manual contact, and, (3) corporeal contact.

1. **Buccal Contact.**—*Kissing* stands pre-eminent among the methods of infection, and very large numbers of cases occur from this cause. Not only does this happen from the more or less lascivious kiss of those having sexual relations, but chancre of the lip are found from this cause in ordinary social and family life, and even very young children are occasionally infected thereby.

Biting furnishes a considerable number of cases, and accidental tooth wounds often give rise to infection; these lesions commonly occur about the face, also on the hands.

Sucking has in times past been the source of many cases of syphilis, when the practice of breast-drawing by the mouth was common, the professional breast-drawer becoming infected and then giving syphilis to many others in the same manner. A number of small epidemics are on record from this source. The sucking of a wound by a friend has in like manner communicated the disease in several instances on record. Also in ritual circumcision syphilis has repeatedly been communicated by the practice of putting the penis in the mouth for the purpose of stanching the blood.

2. **Manual Contact.**—Syphilis is not infrequently acquired through manual contact, which may be considered under the aspect of (1) professional and (2) social.

(1) *Professional Infection.*—Surgeons have been inoculated, both in operations and in necropsies upon syphilitics; dentists have also received chancre of the finger from various operations on the mouths of syphilitic patients; accoucheurs and midwives have in large numbers been infected in their callings, the poison most commonly entering on the first or second finger, through abrasions, or very frequently by the side of the nail. Medical men, and even students, have repeatedly been syphilized in examining syphilitic lesions, most commonly chancres. Not infrequently the poison is carried elsewhere by the finger, and chancres of the eyelid, nose, and other places have been thus caused.

(2) *Social Infection.*—Manual infection in social life is not infrequently of venereal origin, and a case is on record of a chancre of the great toe from contact with the female genitals. Scratches by syphilitic persons have been reported as giving rise to a chancre, and also pinching, although it is more probable that infection took place from subsequent inoculation with buccal secretions. Several cases are on record where policemen have received chancres on the hand from tooth injury in making arrests.

3. **Corporeal Contact.**—In addition to chaneres about the abdomen, hips, and thighs, received in connection with venereal acts, there are a number of authentic cases where individuals were infected innocently during *contact in sleep* with syphilitics. This has been especially the case with infants and young children. There have also been many cases where infection has occurred from carrying and supporting syphilitics.

II. **Mediate Contact.**—The instances and methods of acquiring syphilis by means of some intermediate object are most numerous, and space allows of but the briefest mention of some of the principal features pertaining thereto. The subject may be considered as it occurs in (1) domestic and social life, (2) in industrial life, and (3) in professional life.

1. **Infection in Domestic and Social Life.**—All the objects which may come in contact with the secretions, of the mouth principally, may be the means of transferring the syphilitic poison from one person to another. This mode of infection may be conveniently considered as related to, (1) eating and drinking, (2) household effects, and (3) the care of children.

(1) *Eating and drinking.* Cups, glasses, spoons, knives and forks, etc., have in many instances conveyed the poison. It is very difficult to trace accurately the infection in many of the cases recorded, but there is no question that these have, especially in peasant communities, and on occasions of intimate relationship, as on shipboard and in the camp, served as a frequent means of transmitting the disease.

(2) *Household effects, etc.* Towels, handkerchiefs, pillows, underclothing, as also toothbrushes, masks, plasters, bandages, etc., have all been the agents in conveying the poison; tobacco-pipes have given rise to very many cases of syphilis, and the virus has likewise been received from cigars and cigarettes; also troches and candy passed from mouth to mouth have given rise to infection. Privy-seats, commonly supposed to be a fruitful source of contagion, have very rarely been known to communicate syphilis. Syringes used in common have given rise to infection.

(3) *The care of children.* The transmission of syphilis between nurses and children is a well-recognized and frequently observed fact; many of the cases come by direct contact, and belong to the preceding section, but its occurrence is also not infrequent by mediate infection. Nursing-bottles are perhaps the most frequent instruments of contagion, and many instances of chaneres of the lip or throat, both in attendants and children, are on record as coming from this source; artificial teats, cups and spoons, etc., may also convey the poison. The human nipple has likewise served as a medium of conveying the virus left on it by one child to another. Children have also been infected by diapers, sponges, cradle coverings, and syringes.

2. **Infection in Industrial Life.**—Certain occupations have favored the spread of syphilis, notably that of glass-blowing, where the passing of the blowing-tube from mouth to mouth has infected many from time to time. Infection has also occurred from the assayer's blowpipe, from musical wind instruments, from whistles, and from a speaking-tube. Cooks have acquired syphilis from a tasting-spoon, upholsterers from tack-nails held in the mouth after being in the mouth of a syphilitic, also a shoemaker from pegs used in the same manner. Clerks and others have been syphilized from pencils or objects held in the lips, and some furriers by thread passed through the lips in common. Laundresses have been infected from the clothing of syphilitics, and handlers of old clothes and rags have acquired the disease from this source.

3. **Professional Life.**—In addition to the professional infection already referred to by direct contact, where physicians and others have themselves acquired syphilis, there are numberless cases on record where the disease has been communicated through mediate infection. Space forbids a full consideration of all the various modes of infection which have been recorded, but we may consider some of the most prominent of them.

Vaccination. The chief source of vaccinal syphilis is in virus taken from one suffering from syphilis which in some manner conveys also the specific poison of the disease; it is not believed that the absolutely pure vaccine lymph of the eighth day can communicate the disease, but that there must be an admixture of blood, pus, or some other element from the syphilitic person, in addition to the pure lymph. This may occur from the serum which oozes from the vesicle after the first portion of clear lymph peculiar to vaccinia has been taken, when the surface is urged by pressure to yield more than the normal amount. Cases are also on record where syphilis has been conveyed in vaccination by the use of a lancet soiled with the blood of a syphilitic. Infection may likewise take place from the uncleanly habit of moistening the vaccine point with the saliva, and also from dressings which may subsequently be placed on the wound.

Tattooing. Syphilis has been repeatedly conveyed by this process, and many cases have been traced directly to the operator, who wet the needles or the pigment with his saliva, the mouth being found to be full of mucous patches.

Phlebotomy has given rise to syphilis in several instances, a chancre forming in the site of the wound in the vein, presumably from a lancet infected from a syphilitic.

Circumcision. In certain cases infection has taken place from the dressings applied after circumcision, as Hutchinson has shown, the lint being contaminated by blood from the severed prepuce of a former

infant, which had been placed in the same box. Infection may also arise in still other ways, in addition to the one already mentioned, by the mouth of the operator.

Minor surgery. In a number of instances minor operations, opening of abscesses, etc., have been followed by chancre from the same cause.

Skin grafting and tooth transplantation have both been reported as giving rise to syphilitic infection.

Cupping, especially as practised among the peasantry of Russia, has at times given rise even to small epidemics of syphilis. The infection was mainly supposed to come from the practice of wetting the edge of the cup, which was generally of horn, with the saliva.

Eustachian catheterization. A very considerable number of cases of syphilitic infection have been traced to this cause, many of which came from the practice of one physician in Paris, and a number have been reported in this country.

Sounds, specula, laryngoscopic mirrors, and portes caustiques have all been charged with conveying syphilitic infection.

Dentists' instruments are an occasional means of transferring the syphilitic virus, both the sharper, cutting instruments and even such as the dental forceps; the result has happened, of course, from an ineffectual cleansing of the instrument after use on a syphilitic patient. Considering the abundance of mucous lesions often found in the mouth, and the virulence of the secretion, as shown by other instances of infection from this source, it is surprising that the accident does not more often happen that the dentist is infected, or that he conveys the disease to another.

Razor wounds are a well-recognized seat of chancres; but it is highly improbable that the razor plays any part in the event, other than causing the abrasion through which the syphilitic virus subsequently gains entrance. Nor is it very probable that many of the cases receive the virus from the brush, soap, or towels, at the time of the injury, for these are not at all likely to have come in contact with virus-yielding lesions. It is far more probable that infection takes place subsequently by means of kissing, etc., for, as some one has remarked, men will often get shaved before going to a house of prostitution or otherwise exposing themselves in the company of women. In some instances infection takes place in such a wound from court-plaster which has been furnished and applied by a friend who has used saliva to moisten it.

III. Hereditary Transmission.—This is the subject of a separate section, and need be but briefly touched upon here. It naturally divides itself into (1) syphilis from the father, (2) from the mother, (3) from both parents.

1. *Syphilis from the Father*.—While the syphilitic man may procreate healthy children, all are now pretty much agreed that the child may inherit syphilis from the father alone, without the mother acquiring the disease: in this case the syphilitic poison is conveyed through the semen to the ovum at the time of conception. The fact, commonly known as Colles's law, that the mother bearing a syphilitic child and yet herself showing no signs of syphilis can not be infected at the breast by her own child, while the child may infect a healthy wet nurse, has been thought to show that the mother received the syphilis and so infected the child; but the rather numerous and credible instances of exceptions to this law reported in late years, afford additional proof that the child may receive the syphilis from the father alone. It is thought that the disease is rather milder under these circumstances.

2. *Syphilis from the Mother*.—All observers agree that syphilis may be acquired from the mother alone, and that, at the time of conception, if she be in the active stage of syphilis, uninfluenced by treatment, the child will surely be infected; if, indeed, the child is not born dead or the product aborted at a non-viable age. The questions relating to the influence of syphilis acquired at different periods of gestation will be discussed in connection with hereditary syphilis.

3. *Syphilis from Both Parents*.—When both parents are actively syphilitic, escape from hereditary influence is well-nigh impossible. The effect of the syphilitic poison may be even more far-reaching than is exhibited by the production of syphilitic offspring, and not at all infrequently sterility results. The same may occur from active syphilis in either parent alone, until the disease is overcome by treatment.

IV. **Maternal Infection**.—There has been no little difference of opinion among able syphilographers in reference to the question as to whether a woman can receive syphilis through the uterus, without acquiring the disease in the ordinary way through the medium of a chancre. Many have strongly advocated the view that she can, while others have stoutly denied the fact. The subject may be considered under the two heads: (1) infection by conception, and (2) infection by semen.

1. *Infection by Conception*.—It is universally granted that what has just been referred to as Colles's law holds good almost invariably: the mother of a syphilitic child does not receive a chancre of the breast from nursing her own child, while the healthy wet nurse readily becomes infected thereby—that is, the mother has in some manner been rendered incapable of receiving the syphilitic virus, and, although she may not at the time exhibit any evidences of syphilis, it continually happens that these may appear later. Granting the exceeding great difficulty of determining with certainty that a woman has not had a chancre deep in the vagina or on the os uteri, the innumerable instances of maternal infection on record

by competent observers, without such having been found, would seem conclusive evidence that the mother can be infected through the medium of the uterine circulation from a syphilitic fœtus.

Further, it is a well-proved fact that a woman free from syphilis at the time of conception may transmit to her child a syphilis which she has acquired at least as late as the seventh month of gestation. Now, if the syphilitic poison can pass from the mother by means of the utero-placental circulation to the child, it can also pass, as do the results of the fœtal nutritive changes, from the child to the mother, so that she can be infected by the poison which the ovum has received in fecundation, and which has multiplied with its growth so as to infect the whole child; in other words, the mother can be infected by the conception of a child inheriting syphilis from its father, without acquiring a chancre herself.

2. *Infection by Semen.*—Although many have strongly opposed the view that syphilis could be communicated by the semen without conception, and although the experiments of Mireur with inoculation of this fluid upon four healthy subjects were negative, there are reasons for believing in the possibility of infection by the semen. Moreover, there have been a number of cases, reported by good observers, where, after a very careful investigation, this seemed to be the case.

We have already seen that both the ovum and the spermatozoön are capable of giving the disease to the resulting fœtus; the spermatozoa which hold the syphilitic virus are known to travel up the uterus and through the tubes, so as even to produce fecundation in the abdominal cavity. It does seem more than probable that during their course, perhaps as they become ordinarily disintegrated, the syphilitic element may find a proper lodgment within the uterine cavity, and so infect the woman, even without the formation of any initial lesion.

An explanation of supposed direct infection by semen may, however, perhaps be found in infection by conception—that is, although the woman may not have borne children, still she may have had transient impregnations which were cast off after a few weeks, but which sufficed to develop the syphilitic poison in the fœtus enough to infect the mother.

SYPHILIS INSONTIUM.

The subject of the innocent acquiring of syphilis, or *syphilis inson-tium*, is a large one, and its full consideration would be out of place here. Those interested in the subject are referred to the Alvarenga prize essay, of the College of Physicians of Philadelphia, by the present writer,* where will also be found full references to the matter already given. A

* Syphilis Inson-tium: A Clinical and Historical Study of Syphilis innocently acquired. By L. Duncan Bulkley, M. D. New York, 1893.

Careful study of the literature of the subject shows that the disease has been acquired innocently in vast numbers of instances, and in ways and means which would never have been previously suspected. New methods of infection have been from time to time reported, while of course thousands of cases occur where no accurate knowledge is obtained of the manner in which the disease is acquired.

It has certainly come to pass that syphilis is no more to be looked upon as invariably a venereal disease, nor the person afflicted with it to have been necessarily guilty of improper sexual relations. In a recent article, Fournier showed that in at least twenty-five per cent of the females with syphilis whom he had seen in private practice the disease was acquired in a perfectly innocent manner; and after a careful study of the data of those coming under my own care in private practice I am confident that even a very much larger proportion of the females with syphilis were innocently infected.

The following table, compiled from the statistics of a number of venereal clinics abroad, shows the relative frequency of extra-genital infection occurring among them. Here it will be seen that in 353 instances, or nearly five per cent, the primary lesions were found elsewhere than in the genital and peri-genital region.

TABLE I.

Genital and peri-genital chancres.....	6,770
Chancre of the lip.....	184
" " breast.....	41
" " fingers and hand.....	33
" " tongue.....	17
" " throat.....	16
" " nose.....	8
" " chin.....	7
" " eyelids.....	7
" " cheek.....	6
" " buccal cavity.....	6
" " neck.....	4
" " forehead.....	3
Unclassed.....	21
<hr/>	
Total genital and extra-genital.....	7,123

But the proportion of extra-genital chancres is yet larger than is here indicated, for these statistics relate to venereal clinics, whereas large numbers of cases present themselves in skin clinics, as also in those of the eye, throat, etc., and numbers are seen in surgical and obstetrical practice. These chancres affect all parts of the body, and it is safe to say that there

is hardly any locality which has not been the seat of the initial lesion of syphilis. In the next table are given the location of a large number of extra-genital chancre, most of them innocently acquired, collected from reports of individual cases reported here and abroad.

TABLE II.

Chancre of the lip.....	1,810
“ “ breast and nipple.....	1,148
“ “ buccal cavity.....	734
“ “ fingers and hand.....	462
“ “ eyelids and conjunctivæ.....	372
“ “ tonsils.....	307
“ “ throat (deep oral and nasal).....	264
“ “ tongue.....	157
“ “ chin.....	146
“ “ cheek.....	145
“ “ trunk.....	100
“ “ nose.....	95
“ “ anus.....	87
“ “ peri-genital region.....	77
“ “ legs and thigh.....	73
“ “ forearm.....	59
“ “ neck.....	47
“ “ gums.....	42
“ “ forehead and temple.....	37
“ “ ears.....	27
“ by vaccination.....	1,863
“ “ cupping and phlebotomy.....	745
“ “ circumcision.....	179
“ “ tattooing.....	82
Total.....	9,058

In this table chancre of the lip is seen to lead all the rest, and the principal cause for the sore in this location is undoubtedly kissing. On analyzing the data from which these come, it is seen that an exceedingly small number of the cases come from venereal relations.

Chancres of the breast and nipple which come next in frequency are becoming relatively rare, as the danger from syphilitic nurslings is better known and appreciated.

It is unnecessary to comment on each of the other locations here presented, but it is interesting to note that there are no less than 571 cases of chancre of the tonsils, or of the deep cavity of the throat, in addition to the 734 cases as reported “in the buccal cavity”; these, with those of the

* tongue and gum, make a total of 1,504 cases where the initial lesion of syphilis occurred within the cavity of the mouth. In doubtful cases of syphilis, therefore, it is always wise to consider if the infection may not have occurred in this hidden region, for experience has shown that the sore in this locality often escapes detection for long periods. From the experience of many who have studied the subject, it is highly probable that chancre within the cavity of the mouth is much more frequent than even these statistics would seem to indicate.

PRIMARY SYPHILIS.

By EDWARD BENNET BRONSON, M. D.

Definition.—By primary syphilis is generally understood that phase or condition of the disease which precedes any visible signs of general infection, and is attended only by certain local changes in the vicinity of the site of inoculation. These local changes consist of a more or less characteristic lesion situated at the precise site of inoculation, and known as the *initial lesion*, or syphilitic chancre, and an enlargement of certain neighboring lymphatic glands called the *primary adenopathy*. Like each of the three stages into which, for the sake of convenience, the clinical course of syphilis has been divided, the primary stage has received somewhat vaguely defined limits. For many authorities syphilis becomes a constitutional disease very shortly after its specific virus has been inoculated. The first local sign of infection is regarded as actually a symptom of systemic disease. Indeed, if there be such a thing as a specific syphilitic poison, it must be admitted that, from the moment this poison has been effectively inoculated upon a susceptible subject, this subject unquestionably has syphilis, whether the infection be directly a general one or for a time remains localized, or even should it remain permanently local and never become a general disease. Primary syphilis, then, begins with inoculation. To fix the precise period at which this stage terminates is more difficult. Though the outbreak of a general exanthem, syphilitic fever, and like symptoms evidently marks some definite change in the course of the disease, these signs are not necessarily the first evidence of constitutional syphilis. Preceding these symptoms, often or usually, there are evidences of cachexia and *malaise*, prodromata that indicate clearly that a dyscrasia or some sort of systemic derangement is already in progress before the characteristic marks of secondary syphilis can be discerned. Nevertheless, for a clinical division these marks are sufficiently distinctive, and with their first appearance primary syphilis may be said to have terminated.

Duration.—The duration of primary syphilis varies within very wide limits. In thirty-one cases of artificial inoculation collected by Bäumler (Cyclopædia of the Practice of Medicine, edited by Ziemssen, New York, 1875, p. 76), in which positive results were obtained, the longest period

was one hundred and fifty-nine days. The shortest in which any secondary manifestations were observed was thirty-four days. The mean duration in twenty-five cases in which the occurrence of secondary symptoms was noted was seventy-five days. In round numbers the period may be said to vary from nine to eleven weeks. It is customary, however, in computing the time, to divide this period into two, known respectively as the first and second periods of incubation. The first of these embraces the time elapsing between the inoculation and the appearance of the initial lesion, these two events being always separated by an interval of days or weeks. The second period of incubation covers the time intervening between the first appearance of an initial lesion and the outbreak of the symptoms of systemic infection.

First Incubation Period.—After any region or tissue of the body has been inoculated with the syphilitic poison there invariably intervenes a period of latency, during which the virus to all appearance is dormant and inactive. Every trace of the little abrasion or solution of continuity through which the poison effects a lodgment in the tissue disappears, and no sign either local or constitutional betrays the fact that an infection has taken place. What processes of preparation may be taking place during this period of apparent quiescence may only be conjectured. We may conceive them to be analogous to the germination of seed sown in a fertile soil, though here the soil is a living tissue whose subsequent reactions furnish the only evidence of changes in the implanted germs of syphilis. The period at which these reactions first become manifest doubtless depends more on the nature and constitution of the soil than upon any variation in the character of the seed or virus. It has been observed, however, in experimental inoculations that virus taken directly from the primary lesion of syphilis or from mucous patches is followed by a somewhat shorter period of incubation than that which follows inoculations either from matter of secondary pustular lesions or from syphilitic blood. Some variation, therefore, in the length of the incubation may be due to the source from which the virus is derived.

Comparing the results of artificial inoculations of syphilitic virus obtained from various sources, the mean duration of the period of first incubation has been found to be about twenty-six days. The result thus obtained corresponds pretty nearly to what is observed in ordinary clinical practice. Julien collates the observations of different authorities upon this point with the following results: Diday found the mean duration to be fourteen days; Clerc, fourteen to sixteen; Chabalier, fifteen to eighteen; Le Fort, nineteen; Rollet, twenty-five; Fournier, twenty-six; Sigmund, twenty-eight to thirty-five; Du Mauriac, forty. Taking these nine series of observations together the mean is twenty-three days. But there are wide variations from this. For example, Fournier reports a

case in which the first incubation was seventy days; Simonet and Le Fort, three cases with a duration of ninety days. On the other hand, Diday once saw it last but twenty-four hours, and Le Fort mentions three cases in which it did not exceed seventy-two hours. Cases of such brief incubations as these must, however, be extremely rare. Bearing in mind the possibility of exceptionally long or short periods of incubation, we may pretty confidently look for the appearance of the initial lesion *between a fortnight and a month* from the date of exposure.

Second Incubation Period.—The local sign of infection having made its appearance, another prolonged interval of time elapses before evidences of constitutional infection appear. This is the second incubation. Like the first, it is of uncertain duration, and just what influences determine it are not definitely known. Generally speaking, the more depraved the patient's condition, the more it is subjected to bad hygienic influences, such as deprivations, alcoholic or other excesses, emotional disturbances, and the like, the shorter this period of incubation; while, on the other hand, the fact is pretty generally recognized that by early constitutional treatment, more particularly mercurial treatment, its duration is lengthened. Furthermore, its duration is said to be greater in cold than in hot weather. The shortest period that has been recorded was noted in an experimental inoculation of syphilitic blood by Lindwurm. In this case it was stated to be from eight to fourteen days. In another experimental inoculation by Lindmann, where matter from a secondary ulcer was used, the second incubation was said to be one hundred and fifty-nine days.

In the series of inoculations above referred to the mean duration of the period was between six and twelve weeks. We do not look, therefore, for secondary manifestations under forty days from the appearance of the initial lesion.

THE INITIAL LESION.

This lesion (which is also known as the primary affection, the initial or primary sclerosis, the chancre, the hard, infecting, or syphilitic chancre) is the chief symptom of the second incubation. It invariably begins at the precise point at which the virus has been inoculated, whether one or more. Usually the first thing observed is a *papule*—a slightly elevated or perfectly flat red spot that imparts to the touch a slight sense of resistance, implying the presence of an infiltration. If carefully watched, simply a spot of redness may be perceived before any sign of infiltration can be detected. Again, when attention is first called to it, the surface may appear slightly abraded and moistened with a scanty, clear, sticky secretion. Such are the appearances, at its inception, of the syphilitic chancre when uncomplicated by the presence of any other poison than that of syphilis. Thus far they seem trivial and inoffensive, and not infrequently

are entirely overlooked. Even to the practiced eye they are insufficient to make the diagnosis until further development of the process reveals more positive signs. The first and most characteristic of these is a circumscribed hardening of the lesion. Gradually the infiltration increases, and what was merely a reddened spot, with possibly a trace of thickening in the tissue, becomes a distinctly indurated papule or patch.

Induration.—The induration of the base is rarely absent from any of the forms of the syphilitic chancre. According to Fournier, in not more than one per cent of the cases does it fail to be perceptible. It varies greatly, however, in degree; sometimes so slight as to be barely appreciable to the touch, and sometimes appearing in the form of a hard tumor in the skin, which when held between the fingers feels like a lump of cartilage or wood. It varies also in form. It may be superficial, plate-like, lamellar, feeling as though a piece of parchment or thin leather had been mortised into the skin, or it may occur as a firm, rounded nodule, often with prominent borders and a more or less sunken center, especially in ulcerating forms. When the induration is slight, considerable skill and experience may be required to detect it. If grasped and rolled between the thumb and finger with gentle pressure, the resistance and sharp definition of its margin will usually distinguish it sufficiently from the doughy, ill-defined hardness of an ordinary inflammatory thickening, or from the infiltration of the simple or "soft" chancre. In many cases it is as obvious to the eye as to the touch. The circumscribed, rounded, indolent tumor, extending beyond the seat of ulceration or erosion, is often in itself characteristic. If subjected to pressure by the fingers or in any other way, as, for example, when situated upon the prepuce by slowly retracting the foreskin, the resistance offered by the hard tumor produces a temporary ischæmia of the intervening blood-vessels and the surface is blanched. When the prepuce is retracted with an induration on its inner surface, the resistance to its eversion is similar to that of the tarsal cartilage when the upper eyelid is everted.

To best appreciate the induration by touch, the tissues must be soft and lax as well as easily accessible. It can usually be more easily felt upon mucous membranes than upon the skin. It is hard to make it out when the tissues are firm and resistant, as, for example, upon the fingers. For the same reason it is not always distinct upon the glans penis nor on the cervix uteri. In the latter situation it might be mistaken for a cicatricial thickening, such as often follows injuries to the os in parturition. An induration of the female genitals is more often overlooked than it is when affecting the male genitals, and partly for the reason that in the former case it is not apt to be so conveniently situated for palpation.

The *involution* of the syphilitic induration is accomplished slowly, and is often not complete till some weeks after the occurrence of second-

ary manifestations. Under local and especially under mercurial constitutional treatment it disappears more rapidly than when left to its natural course. As with other granulomata, involution begins at the central or oldest portion of the little tumor, which accounts for the slight depression that usually appears sooner or later, and is the point where ulceration or erosion is most apt to occur, though these latter are by no means necessary concomitants.

Occasionally certain vestiges of the initial lesion persist for long periods. Usually a slight pigment spot only is left, which disappears in a short time, the pigmentation first disappearing from the center and gradually receding toward the periphery, resembling a spot of vitiligo. Sometimes the loss of pigment over the site of the induration is such as to leave a minute patch, whiter than the surrounding skin, and this may persist for years. In other cases the induration, instead of undergoing complete involution, becomes to a certain extent organized, leaving a little knot of cicatricial tissue which never disappears. In some rare instances, when the primary induration has lasted long beyond its usual duration, there may be a transformation of the lesion into a gummy tumor. Unna (*Vierteljahressch. f. Derm. u. Syph.*, 1878, p. 567) excised an induration of the prepuce, of eight years' standing, which was the remains of an initial lesion, and found the characteristic structure of a gumma. In a large proportion of cases, within a month or two after the advent of the secondary period every trace of the primary lesion has disappeared.

Number of the Lesions.—In simple noninfecting chancre the lesions are, as a rule, multiple; at least they tend to become multiple sooner or later, owing to the virulence of their copious secretion and the liability to auto-inoculation. The syphilitic chancre after it has fully developed is practically non-auto-inoculable. At the start there is perhaps as much likelihood that the simple chancre will be single, as the syphilitic, but subsequently multiplicity becomes in the former one of its diagnostic marks. When the syphilitic virus is brought in contact with two or more abraded spots at the first exposure each of these becomes an independent port of entry, and at each one an independent initial lesion develops. Under these circumstances the multiple lesions usually develop simultaneously. It sometimes happens, however, that during the period of incubation the patient exposes himself to a fresh inoculation with syphilitic virus. In that case the inoculation is usually ineffective, unless it occur within a short time after the first inoculation. Though the time at which immunity from a second infection is acquired is not absolutely determined, it is certain that unless the second inoculation be sufficiently far in advance of the period of constitutional infection, the incubation will be interrupted and the development of a second chancre will be forestalled. There is reason to believe, however, that in some cases suc-

cessive chancres are the product of successive inoculations. Du Castel (*Ann. de Derm. et de Syph.*, 1890, page 423) has reported two cases of primary syphilis, in one of which there were thirteen separate lesions, and in the other seven, all apparently syphilitic in character. Though tending to deep ulceration, none of them were auto-inoculable, and the glands were but slightly affected. In both cases constitutional syphilis followed.

Multiplicity in the initial lesion of syphilis is doubtless often due to pre-existing lesions of the part affected that destroy the integrity of the epidermis or epithelium at several points, and thus afford as many points of entry for the syphilitic virus. The so-called herpetiform chancres of Debné may be produced in this way, the original inoculation having been effected through the ruptured vesicles of a herpes progenitalis. The multiple erosions of a balanoposthitis may become the sites of infection, in which case there is usually, besides several distinct chancres, a more or less diffuse thickening of the prepuce and glands. Similarly the inoculation of "sore nipples" in a wet nurse is often followed by multiple indurated lesions. In this case, as in the majority of instances where the initial lesion is multiple, it is usually impossible to determine whether the inoculations at all the affected points were simultaneous or not, for several syphilitic chancres may develop successively, notwithstanding all points were inoculated at the same time.

Varieties of the Initial Lesion.—Variations in the form or course of the so-called syphilitic chancre may depend either on accidents attending the inoculation, as in the cases of multiple lesions just mentioned, or upon the susceptibility and peculiarities of the individual, or of the particular part or tissue affected. In its simplest form—the form in which it most commonly presents itself after artificial inoculations—the initial lesion is merely an indurated papule. It is generally designated as

The Dry Scaling Papule.—In some cases after accidental infection, as well as after experimental inoculation it runs its entire course without any further solution of continuity than consists in a slight desquamation of the cuticle. The surface remains dry, and in its course and general appearance, except for a little more hardening of its base, the lesion closely resembles a lenticular papule of the secondary stage. It is usually met with upon a free surface, where unexposed to maceration or friction. A similar lesion may occur upon the mucous membrane, where two surfaces are in apposition, but there is usually thus a tendency for the infiltration to spread peripherally, so as to form a platelike induration, the epithelium remaining intact. The following curious case was of this character: "The patient had an unusually long and relaxed prepuce. The glans had an appearance as if some whitish substance like wax had been introduced just beneath the epithelium, so as to form a flat, uniform

coating, slightly elevated above the *niveau*, and terminating near the corona by an abrupt rounded edge, without any encircling areola or swelling. Above this the epithelium seemed to be perfectly intact, and was firm and smooth, with a bright, glistening aspect entirely unlike the dull, moist, sodden appearance of a mucous patch or an erosion covered by a membranous exudation. To the touch there was a slight degree of resistance, but no marked induration. . . . Its peculiar course was doubtless influenced by the presence of the elongated prepuce, which by its pressure may have tended to cause the infiltration to spread out in area, while at the same time it protected the epithelium from injury or abrasion. The lesion was accompanied by indurated inguinal glands and was followed by syphilis." (Wood's Reference Handbook of the Medical Sciences, vol. ii, p. 67, New York, 1886. The same case was reported also by Morrow, in Arch. f. Derm., 1876, p. 383.) Taylor states that sometimes similar lesions form about a central nodule of induration.

The Superficial Erosion.—This probably represents the most common form of the initial lesion when uncomplicated with simple chancre. It appears as a little round or oval spot, from which the superficial layers of the epithelium have been removed, and which presents a slightly moist, smooth, raw surface. It may be covered with a gray film, which frequently, however, occupies only the central portion. The edges are level with the surrounding skin, while toward the center there is often a slight depression. Occasionally the surface is raised like a little dome above the *niveau* (*ulcus elevatum*). This elevated form is most frequently observed at the borders of the prepuce, upon the frenum, the lips, the tongue, or upon the vaginal portion of the womb. The center of the little elevation may be slightly indented. Occasionally the superficial erosion is transformed into a mucous patch, or condyloma, especially in situations habitually moist, and hence tending to produce maceration.

The Ulcerating Initial Lesion (*Ulcus durum*, Hunterian chancre).—As already intimated, among the processes that take place during the stage of primary syphilis, ulceration constitutes no essential part. The initial lesion may pursue its entire course and disappear without a trace of ulceration, and even without the surface being eroded. It would be well, indeed, if the term chancre, which properly denotes a corroding sore, were restricted to that form of septic and destructive inflammation which is almost constantly venereal in its origin, and which in this country has come to be known almost universally by that superfluous and irrational designation *chancreoid*. If any disease should be called chancre, it is the one whose constant and essential feature is destructive ulceration; while, if the term chancreoid is applicable to any disease, it is most so to the one which only accidentally ulcerates or becomes chancreous. The use of the term chancreoid for the soft venereal sore is inferentially an indorsement of the

doctrine of Clerc, who first adopted it, in the belief that there was no contagious venereal sore not of syphilitic origin. The soft sore originated from the inoculation of syphilitic virus upon a syphilitic individual. It was merely a modified syphilitic sore. It was the derivative of the syphilitic chancre, and in that sense might properly be called chancroid. But Clerc's doctrine being now discarded, this justification of the term no longer exists.

Ulceration is, however, a very frequent complication of the initial lesion of syphilis, and may even be of a corroding character—that is, it may be attended with pretty extensive destruction of tissue, and may so closely resemble in its salient features the soft venereal sore, that under these circumstances it is convenient to speak of the *syphilitic chancre* in contradistinction to the “*simple*” or *nonsyphilitic chancre*. It not infrequently happens that both diseases are inoculated at the same point, whether simultaneously or at consecutive periods, and each produces its own peculiar effects in the so-called “mixed chancre,” which will be considered later on.

Moreover, the syphiloma is a growth of very low vitality, and under irritative influences of various sorts is exceedingly prone to rapid disintegration. Its presence so affects the growth and nutrition of the overlying epithelial or epidermic structures that under the action simply of heat and moisture these structures become macerated and easily eroded. In this way ulceration may occur simply as the result of spontaneous disintegration, though most frequently aided by extraneous influences and by the presence of septic agencies not necessarily chancrous. But usually in syphilitic chancres the loss of substance from ulceration is more apparent than real, owing to the central depression and salient borders of the induration. The resulting cicatrix is often insignificant, when the appearance of the ulcer seemed to denote an extensive destruction of tissue. At all events, the ulcer of the syphilitic chancre is very different in appearance from that of the simple chancre. Its edges are not undermined nor jagged, and are sloping instead of perpendicular. Even in the deeply ulcerated or infundibuliform ulcers the edges do not rise abruptly to the surrounding skin, but approach it gradually by a smooth incline. It is altogether a less virulent disease, so far as the local effects are concerned, is less inflammatory, less sensitive, has a less abundant secretion. But the chief evidence that it is less virulent is shown by the absence of that characteristic property of the soft sore—to wit, auto-inoculability. The syphilitic chancre is not auto-inoculable unless it contain some virus other than that of syphilis. It is a well-known fact that any syphilitic ulcer may, through simple inflammatory irritation, acquire a virulence sufficient to render it auto-inoculable. Practically the only virus that is known to produce this effect in the syphilitic initial lesion is the virus of the “simple”

chancre. As intimated above, both these affections may exist at the same time and within the same area. The product is known as

The "Mixed Chancre."—Those effects which this term is designed to express have been observed almost exclusively in connection with accidental infection and usually of venereal origin. Never have they been known to occur when syphilis has been inoculated from pure syphilitic lesions experimentally. Yet it is these very effects that have long been the subject of contention between the unicists and the dualists; between those, on the one hand, who believe that syphilis and chancre are essentially one disease, and those, on the other, who maintain that they are two separate and independent diseases. That the latter view is the one upheld by the writer is sufficiently implied in what has already been said.

Viewed from the most rational standpoint, the so-called mixed chancre is not, properly speaking, a peculiar variety of chancre, but rather represents an accidental combination of two diseases, viz., syphilis and chancre, just as in the late squamous syphiloderm of the palm we may have a combination of syphilis and eczema. As in this latter case it is often extremely difficult to tell precisely what lesions or appearances are due to syphilis and what to eczema, so, in the mixed chancre, the two independent processes are very liable to be confounded. It is, furthermore, a sufficiently well-known fact that oftentimes a lesion, more especially venereal, whose appearance at first can not be distinguished from the soft chancre, is followed by induration of its base, and in due course of time by constitutional syphilis. Moreover, it is generally conceded that, of two individuals cohabiting with the same person and at nearly the same time, one may acquire chancre simply, the other syphilis. Doubtless facts of quite similar purport might be cited with regard to the inoculation of vaccinia and syphilis. Considering the multiplicity of accidents that may occur, and the various modes of contagion possible in promiscuous intercourse, any conclusions derived from their consequences must necessarily be very inexact. Any inferences drawn from such sources that are adverse to the doctrine of duality are more than offset by the one indubitable fact that, whenever in experimental inoculations the virus has been taken from uncontaminated syphilitic lesions, no such effect has ever been produced as could for a moment be mistaken for the simple chancre. Simple chancre is produced only by simple chancre, and if syphilis follows there is always reasonable ground for the inference that with the chancreous virus there was commingled syphilitic virus. The result of this combination is a lesion which at first, and for a considerable period, has all the characteristics of, and indeed is, a soft chancre. But in the tissue beneath, where at the same time were lodged the germs of syphilis, the primary incubation is in progress, and in process of time, as the syphilitic induration of the base reveals itself, the lesion is gradually transformed

from the virulent, inflammatory chancreous sore into the characteristic form of the exulcerated initial lesion. This change takes place usually soon after the completion of the first incubation period, and by the time the induration has fully developed all the characteristics of the simple chancre may have completely disappeared.

When the ulceration in the initial lesion is extensive, the induration of the base and borders is usually in proportion, though in some cases, when it spreads rapidly or is phagedenic, the induration melts away before it and may be scarcely perceptible. Sometimes it happens, after the ulcer has cicatrized but the induration still remains, that the cicatrix reopens and ulceration begins afresh. It is the so-called relapsing chancre (*chancre redux*). Under these circumstances the sore is liable to become gangrenous. A moist, gray, pultaceous slough forms, which after separating may be succeeded by another and thus lead to a spreading phagedena. The induration may break down interiorly and open upon the surface by a number of apertures. Such events are more liable to occur when the sclerosis is extensive. -

THE PRIMARY ADENOPATHY.

An invariable accompaniment of the initial lesion is an enlargement and induration of the nearest lymphatic glands, or those with which the lesion is in most direct anatomical communication. It usually appears by the end of the first week after the appearance of the initial lesion, though occasionally later. In some rare cases, more especially in very fat subjects, it may be impossible to feel it at all, but there is every reason to suppose that it is present nevertheless. In its nature this glandular enlargement corresponds very closely to the induration at the point of inoculation. Though the hyperplasia is inflammatory, the inflammation is of a sluggish, indolent character, unaccompanied by heat, redness, pain, sensitiveness, or œdema. Usually several glands are involved, producing a polyadenitis which markedly distinguishes it from the monadenitis of the simple chancre. Each gland can be separately felt as a hard, round, sharply defined nodule, freely movable under the skin. In some situations but a single gland may be accessible to the touch, as in the case of some extra-genital lesions.

The most characteristic adenopathy, and the one most frequently observed in primary syphilis, is that following inoculation of the genitals—the so-called syphilitic bubo. In this case the cluster of enlarged glands in the groin is in marked contrast to the single, inflamed, baggy, or fluctuating tumor of the bubo of chancre. Usually three or four glands are distinct, though at the commencement but one may be felt on the side corresponding with the initial lesion. The adenopathy may remain confined to one side, though rarely, and is usually most pronounced upon the

side first affected throughout its course. The glands most readily felt are the superficial ones that lie just along the line of Poupart's ligament, though it is certain enough that the affection is not confined to these. The crural glands are doubtless more or less involved, as well as the iliac. Three specimens preserved in the *Musée de Lourcine*, and described by Fournier, will show the extent to which they may be implicated. These specimens were taken from women who died in the primary stage of syphilis with genital chancres. Besides the enlarged glands in Scarpa's triangle, others occurred along the iliac vessels as high up as where the hypogastric is given off.

Very rarely in the primary adenopathy of syphilis is there suppuration. When it occurs it is either due to the fact that the initial lesion has been irritated and inflamed, or else because the lesion is a "mixed chancre." In the last case the secretion of the suppurating gland has the ordinary virulent properties of the chancreous bubo.

LOCATION OF THE LESIONS OF PRIMARY SYPHILIS.

We have no reason to suppose that the tissues of the body are not everywhere equally susceptible to syphilitic infection; the sole condition being that the virus be brought into sufficiently direct communication with the absorbents. Excepting the instances of infection by inheritance, or through the medium of the utero-placental circulation, the only parts ordinarily exposed to syphilitic contagion are the cutaneous surfaces or the mucous membrane near the mucous orifices, and in these situations the incipient lesions are always the same—an induration at the point of inoculation and a neighboring adenopathy. Inasmuch as in the great majority of cases the origin of syphilis is venereal, most frequently the initial lesion is upon the genitals.

Lesions upon the Genitals.—In the male, the most common situations are, first, the balano-preputial fold, or *sulcus coronæ glandis*, where rents or abrasions are most liable to occur, and following this the mucous membrane of the inner surface of the prepuce, the frenum, the preputial orifice, the outer surface of the foreskin, the glans, meatus, urethral canal, serotum, and peno-scrotal angle.

In the *sulcus* the lesion may be either in the form of the superficial erosion or of the ulcerating variety known as "Hunterian chancre." There is a tendency for the secretions to collect in this situation, giving rise to suppuration and the production of an ulcer.

Sometimes in this region the infection apparently begins in a follicle, causing a little cylindrical induration in the mucous membrane, which may afterward ulcerate. A number of such indurated follicles may coalesce so as to form a hard, massive thickening surrounding the glans like a collar.

Upon the *mucous membrane of the prepuce* the induration is usually well marked, and when the foreskin is everted slowly the blanching of the surface is especially characteristic. At the preputial orifice the lesion may appear in the form of the "dry, scaling papule," and in some cases, especially of congenital phimosis, as a massive, cartilagelike induration. Occasionally in this situation it may take the form of an indurated fissure.

Upon the *glans* the appearances of the initial lesion vary according as the part is habitually covered or not by the foreskin. In the former case it usually occurs as a "superficial erosion"; in the latter it may be the "dry papule."

When the *meatus* is the seat of the primary lesion the induration is apt to encroach upon the passage so as to cause more or less impediment to the flow of urine; but the constriction is only temporary, and usually entirely disappears when the period of primary lesion has elapsed. According to Bassereau, of 361 syphilitic chancres, 14 were in the urethra, but all near the meatus. Clerc found 33 in 404 cases, all at the meatus. Fournier found, out of 474 initial lesions, 32 at the meatus, and 17 so deeply situated in the canal that they could not be seen by stretching open the lips. Among 1,773 cases of Bassereau, Fournier, Clerc, and Léon le Fort, tabulated by Julien, there were 89 at the meatus, while only 17 occurred more deeply in the urethra. Syphilitic initial lesions concealed in the urethra (*chancres larvés*) may, as taught by Ricord, account for a certain number of cases of syphilis in which the ports of entry remain undiscovered; but nevertheless such lesions must be extremely rare.

The female genitals, according to Fournier, are liable to syphilitic infection in the following order: The labia majora, the labia minora, the fourchette, uterine neck, region of the clitoris, vestibule of the vagina, meatus urinarius, upper commissure of the vulva, and vagina.

The effect of the moisture to which it is exposed upon the female genitals is apt to produce certain modifications of the initial lesion, often converting it into the form of the mucous patch. Condylomata lata are much more frequently associated with the primary sore of the genitals in the female than in the male.

When the lesion occurs upon a *labium majus* it is often of an ecthymatous character. In this situation also it may be associated with a superficial lymphangitis, giving rise to an indurated oedema, and in some cases results in a hyperplasia or elephantiasis that may persist for years.

The *fourchette* is less liable to be the site of the syphilitic initial lesion than of the simple chancre, the relative frequency of the latter in this situation being due to its exposure to auto-inoculation.

Syphilitic chancre of the uterus occurs more commonly upon the anterior than the posterior lip. It usually appears as a smooth, flat, or some-

times elevated lesion, of a grayish color, as though covered by a false membrane and encircled by a red border. Unless the induration is massive it is not easy to make it out by the touch. The adenopathies attending the lesion in this situation may be confined to the pelvic glands. The glands in the groin are not often affected.

Primary syphilis of the vagina is extremely rare. The toughness of the mucous membrane lining this cavity, as well as its distensibility, render it but little liable to a rent or other injury which could serve as *foramen contagiosum*; and furthermore, the abundant secretions that flow over it would tend to prevent the lodgment of the poison. Should the lesions occur in the vagina, the inguinal glands would be enlarged.

Extra-genital Lesions.—The syphilitic primary sore is relatively much oftener extra-genital than the simple chancre. According to statistics collated from different authors by Julien, out of 3,956 simple chancres, 66 were extra-genital (not including the chancres of the anus), or about two per cent; while out of 1,977 syphilitic chancres, 126 were extra-genital, or over six per cent.

Again, extra-genital chancres are much commoner in women than in men. According to the authority just referred to, they amount to about twenty-two per cent of all syphilitic chancres in women, and less than four per cent of all those in men. This disparity in the two sexes mainly concerns the chancres of the breast, which occur almost exclusively in women. Moreover, in them the initial lesion occurs more frequently in the mouth and also at the anus than it does in men.

Of the anus. Julien states that its relative frequency in men is 1:119, while in women it is 1:12. In the former it almost always implies sodomy; but in women, while it may be the result of unnatural practices, it is possible for it to occur by mediate contagion from secretions impregnated with syphilitic virus flowing over the anus during coitus with a syphilitic man.

The lesion may occur at the sphincter in the form of an indurated fissure, though usually it appears below it. In the latter cases it is generally found in one of the radiating folds as an elongated erosion. The induration is difficult to appreciate in this situation. For this reason, and because but little discomfort is occasioned by it, it is very apt to be overlooked. The adenopathy is in the inguinal glands.

The rectum has been known to be the seat of a syphilitic chancre but very rarely.

Of the breast. As already intimated, when the breast is the seat of the primary trouble, multiple lesions are not uncommon. The most common site is just at the base of the nipple, in the furrow separating it from the areola; next in frequency upon the nipple, then the areola; and, finally, upon the surface of the breast, outside the areola (Fournier).

In its form the lesion may be a superficial erosion, an indurated fissure, an ulcerating sore with depressed center, or an *ulcus elevatum*. When the woman is not nursing a child the lesion is often ecthymatous. The induration is usually sufficiently well marked, and remaining, as it generally does, for a considerable time after the appearance of secondary manifestations, it becomes of great value in determining the original site of infection. In this the enlargement of the axillary glands, together sometimes with a chain of swollen glands just below the border of the pectoral muscle, will be of material assistance.

Of the head—cephalic chancre. About four per cent of all cases of acquired syphilis are said to originate in inoculation of some part of the head, and more especially of the mouth. Of 852 extra-genital chancres (syphilitic) in statistics collated by Poray-Koschitz (Arch. f. Derm. u. Syph., 1890, Heft 6, p. 928), 632 occurred on the head, 141 on the trunk, 68 on the extremities, and 11 on the neck. Of 29 cases of his own, 9 were on the lips, 7 on the breast, 4 in the throat, 3 upon the tongue, 2 on the fingers, and 1 each on the body, forearm, and hard palate. Of these 29 cases, the 17 cephalic chancres were all of the mouth. According to statistics given by Jullien, of 126 "extra-genital chancres" (initial lesions), 87 were cephalic, and of these, 73 were of the mouth.

Why *syphilitic infection of the mouth* should be of such frequent occurrence is not hard to understand. In most cases, probably, the communication is from mouth to mouth. This region in syphilitics is especially liable to moist lesions, more particularly mucous patches, the secretions from which, always extremely contagious, may in numberless ways be communicated to other individuals. It is not only by immediate contact, as in the act of kissing, that the contagion may occur, but mediately in the most varied ways. Indeed, the possibilities in the way of mediate infection are well-nigh infinite. New modes of contagion are continually being suggested, and to enumerate them all is needless, were it even possible. Any article whatsoever that has been contaminated with the syphilitic virus may become the vehicle of the disease, and however brought in contact with the mouth or its cavity, provided it finds an abrasion or other aperture in the epithelial surface, may become the means of infection. When a nursing infant is infected from a syphilitic wet nurse, it is usually in the mouth, from some specific lesion of the nipple. Furthermore, it should not be forgotten that the vile practices of sodomy, and the species variously known to the ancient Romans as *fellator*, *cunnilingus*, and *irrumator*, are by no means extinct, and must be held accountable for a certain proportion of cases of primary syphilis of the mouth.

By far the most common situation of the initial lesion of the mouth is the lips, the next is the tongue, and following these the gums and the

tonsils. *Upon the lips* the inoculation is most apt to occur at the site of a fissure, such as is often found either at the center of the lower lip, or on the upper a little to one side of the median line, and also at the commissures. Any other point where an abrasion happens to be may afford entrance to the poison. When the initial lesion originates in a fissure, the first appearance it generally assumes is that of an indurated cleft in the vermilion border, with red or grayish base. The induration of the lesion in this situation usually grows to a considerable size, causing protrusion of the lip, and is frequently attended with ulceration. When the sore occurs just within the lips there is generally less induration. The submaxillary glands are always enlarged.

Syphilitic chancre of the tongue is usually flat or slightly elevated, smooth, and red. When just at the tip, the appearance is often as though a piece had been sliced off. The induration is sharply defined, and the adenopathy is to be sought in the suprahyoid glands.

Initial lesion upon the tonsil is marked by considerable induration, with enlargement of the cervical glands (particularly the deep sternomastoid) and the submaxillary. Usually there is ulceration, which may be either slight or extensive. In one case, in which the patient confessed to the rôle of *fellatrix*, the appearance of the throat suggested a malignant diphtheria, though lacking the adherent membrane. In another, affecting a child, no ulceration at all could be discovered, and the inflammation was but slight, though the tonsil, together with the glands under the jaw, were much indurated.

Upon other portions of the head syphilitic infection is usually the result of mediate contagion, sometimes from soiled fingers (as presumably in most of the chancres of the eyelid), possibly from an unclean razor, as when the lesion appears on the chin. Infection of the Eustachian tube through catheterization with an unclean instrument has been reported.

Syphilitic infection of the fingers is an accident to which physicians and nurses are especially exposed, more particularly in the practice of midwifery, but also in various digital examinations of parts affected with syphilitic lesions or in operations upon syphilitic subjects. Sometimes a dentist is the victim. Taylor (Journal of Cutaneous and Venereal Diseases, June, 1890, p. 206) has reported two cases in which the evidence seemed to point to infection from cadavers, acquired while making post-mortem examination. He calls "attention to the fact that in both cases the autopsy was made in a comparatively short period after death. In the first, eight hours had elapsed, and in the second case nine hours after death, before the post-mortem examination was made." Such an accident must be extremely rare, and doubtless could not happen unless the examination were made shortly after death and before cadaveric

changes have taken place. But infection of the finger is not always a *sypilis insontium*. What may be termed digital dalliance involves quite as much danger as the *tactus eruditus*. Even should the contaminated fingers escape inoculation, they may convey the infection to any other part of the body, and thus so-called "erratic chaneres" may often be explained.

The site of the initial lesion of the finger may be that of any accidental abrasion that happens to be present, and thus is brought in contact with the syphilitic virus. Most usually it is a hang-nail that serves as the port of entry, or it may be just at the fold of the nail. The lesion is usually attended with a great amount of thickening, and often the induration is well marked, though it may be less sharply defined than when affecting tissues more lax. There is ordinarily but little ulceration, though the surface may look raw and red. It is often markedly elevated. It is always accompanied with an enlarged and indurated epitrochlear gland, and usually with a chain of enlarged glands in the axilla.

Diagnosis.—*Confrontation.*—Inasmuch as the initial lesion of syphilis is invariably the result of an inoculation of virus derived mediately or immediately from some syphilitic individual, the diagnosis of a suspected lesion may sometimes be corroborated or confirmed by an examination of the person from whom the infection has probably been derived. This method of diagnosis is, however, very unreliable, and in most cases extremely unsatisfactory. Not always does the patient know whom to suspect, or the person suspected may be inaccessible or not amenable to an examination. The possibilities of mediate contagion greatly complicate the difficulties of the investigation. It is possible that the person giving the disease may act simply as the bearer of syphilitic poison derived from some prior contact with a diseased person, without being *in propria persona* syphilitic. In such a case naturally no lesions would be found, and the confrontation would explain nothing. But, on the other hand, no lesions may be found and yet the person may be syphilitic and have communicated syphilis to our patient. Though doubtless rare, cases of this sort are vouched for on good authority. How are they to be explained?

Sometimes, perhaps, by assuming that a primary or secondary lesion of syphilis secreting the virus has been overlooked or concealed—possibly a *chancre larvé*. It is possible that through some traumatism escaping blood may be the vehicle of syphilitic virus. In early syphilis the blood undoubtedly contains the virus, though in experimental inoculations it has been found less infectious than the secretions of moist mucous and cutaneous lesions of the disease. When inoculated successfully, it has generally been during periods of activity or recrudescence of the disease, and when used copiously over rather extensive surfaces, as, for example,

in the cases of the anonymous physician of the Palatinate who inoculated leg ulcers with syphilitic blood. It is somewhat difficult to suppose that the blood of an infected person who is entirely devoid of syphilitic manifestations, and whose syphilis is presumably, therefore, in a certain degree dormant, would possess sufficient virulence to infect another person, especially when we consider the meager amount that would be likely to come in contact with so trifling an abrasion as is usually the point of infection. It can not be denied, however, that this may take place.

What secretions in the body of a syphilitic other than those coming from specific lesions may contain the syphilitic virus in sufficient amount to be infectious is not certainly known. That through the physiological secretions syphilis is not inoculable, has been pretty certainly demonstrated, except with regard to the semen; and its virulence, so far as is known, is never exhibited except in infection of the ovum it impregnates. As to pathological secretions we are not so sure. Ordinarily they are probably not syphilitically infectious unless the product of syphilitic lesions or of other lesions complicated by a syphilitic infiltration. The "mixed chancre" may communicate syphilis, because the simple chancre in this instance has, without much doubt, a syphilitic infiltration at its base. The same explanation may partly apply to the vaccine syphilis, though this mode of infection is usually explained as due to accidental admixture of the vaccine virus with formative elements of syphilitic blood.

There is a suspicion, based on respectable testimony, that certain pathological discharges from the genitals of syphilitic persons, without solution of continuity or any definite lesions of a syphilitic character in the parts affected, may communicate syphilis. Assuming this to be true, a ready explanation is afforded for the unfortunate experience of John Hunter, who acquired syphilis by inoculation of the urethra with what he supposed to be simply gonorrhœal pus. A syphilitic urethritis is admitted and described by Henry Lee, Berkeley Hill, Vidal, and others, and its discharge is believed to be capable of producing syphilis when inoculated upon a nonsyphilitic subject. Lee believes that such a urethritis or vaginal discharge may occur not only as a secondary manifestation but also as a symptom of the primary stage. In the latter case it usually occurs as a prodroma of primary syphilis, the initial lesion appearing later as a localized induration somewhere upon the genitals. But in both cases the discharge is believed to be capable of imparting syphilis (*Lectures on Syphilis and on some Forms of Local Disease affecting principally the Organs of Generation*, Philadelphia, 1875, pp. 62-77). Tarnowsky, of St. Petersburg, has reported experiments leading to a similar conclusion (*Vorträge ueber venerische Krankheiten*, Berlin, 1872). Eighteen inoculations were performed by him with blennorrhagic matter from the geni-

tals of syphilitic patients upon healthy persons, and in one instance with a positive result. One of the persons so inoculated developed a well-marked induration, followed by general syphilis. The experiments were done under every precaution, any possible contamination from syphilitic lesions or from admixture of blood being carefully avoided. This case would imply that not only are those urethral or vaginal discharges which are supposed to be purely syphilitic in their origin, liable to communicate syphilis, but the same effect may be produced by a gonorrhœal discharge in a syphilitic subject. If the facts observed by these authorities have been correctly interpreted, they serve to show that a diagnosis based upon the result of confrontation may be entirely fallacious. The person examined may, though syphilitic, show no obvious signs of the disease, and the presence merely of a "viscid grayish secretion, resembling oatmeal gruel," as the syphilitic genital discharge has been described, could scarcely be taken as sufficient ground for an accusation of specific disease.

But this, after all, is not the most difficult case. If our patient has acquired syphilis, the effect of the inoculation will be an initial lesion, with features more or less clear, distinct, and easily recognized. It is when the first appearance of disease has the character of a corroding ulcer that the greatest difficulty arises. Is it simple chancre, or syphilis? We shall now probably find, if the examination is possible, that the infecting party has likewise a lesion or lesions with chancreous characters. The virus of chancre is there; is there also present the poison of syphilis? Here confrontation becomes of great value as an assistance to diagnosis. If it be ascertained that the infecting party is syphilitic, the lesion, however much it may correspond in appearance to the simple venereal sore, has all the potentiality of the "mixed chancre" which has already been described. Syphilis may have been communicated, but whether it has or not can only be determined when the incubation period has elapsed, and the transformation of the lesion from the aspect of a simple chancre to that of the syphilitic chancre described above gradually unfolds its true character.

Points of Contrast between Primary Syphilis and Simple Chancre.
—Unmistakable as are the features of the initial lesion of syphilis in its natural and uncomplicated form, when ulceration is associated with it, as in clinical practice it very often is, a differential diagnosis between syphilis and the simple venereal sore may at the start be extremely difficult. It is possible only by having clearly in mind all the essential points of distinction between the two diseases. They are exhibited in the following table :

PRIMARY SYPHILIS.

SIMPLE CHANCRE.

Origin.

Often not venereal.

Almost always venereal.

Produced by either mediate or immediate contagion; by inoculation not only of secretion from the initial lesion of syphilis but from any exuding lesion of the secondary period, and possibly from certain genital discharges in syphilitic subjects not associated with syphilitic lesions.

Almost always produced by immediate contagion, and only by inoculation of secretion from a chancreous lesion—i. e., simple chancre or chancreous bubo.

Incubation.

Usually from a fortnight to a month.

Reaction within twenty-four hours.

First Appearance.

A papule or slightly thickened, eroded spot.

A pustule or ulcer.

Number of Lesions.

Usually solitary; more rarely multiple, and then, as a rule, the multiple lesions appear simultaneous, seldom successively.

Rarely solitary. Multiple lesions often develop successively.

Seat.

Not uncommonly extra-genital.

Almost exclusively on the genitals or their immediate vicinity.

Induration.

Is almost constantly present; is firm, elastic, and sharply defined.

A rare and accidental occurrence. When present, is a simple inflammatory thickening, that to the touch is compressible, inelastic, and ill-defined.

Surface.

Sometimes dry and scaling; more often moist, smooth, red or grayish.

Always moist or incrustated, with grayish, uneven, pultaceous surface.

Form.

Usually round or oval, with regular outline.

At first round, later angular in outline, with irregular borders.

PRIMARY SYPHILIS.

SIMPLE CHANCRE.

Ulceration.

Not essential; often absent.	Essential.
Nearly always superficial; even when excavated or funnel-shaped, edges smooth and sloping.	Deep, sinuous, with perpendicular, undermined, or jagged edges.

Secretion.

Scanty and serous except under the influence of unusual irritation, when it may be abundant and purulent.	Copious, purulent; often sanious.
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Sensation.

But slightly sensitive.	Sensitive.
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Inoculability.

Inoculable upon a person not syphilitic.	Always inoculable upon others.
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Rarely auto-inoculable. Not inoculable upon a syphilitic person.	Auto-inoculable to an indefinite extent.
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Adenopathy.

Polyadenitis; indolent; rarely suppurates.	Monadenitis; commonly acute, suppurating, and virulent.
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Bearing these points of distinction in mind, it should be comparatively easy to distinguish the initial lesion of syphilis from a simple chancre, provided these lesions always preserved their typical character. But unfortunately this is not so. In a large proportion of cases the normal features of the initial lesion are marked by inflammatory effects that are only accidental concomitants and the product of extraneous influences. Through irritation, the syphilitic process may be diverted from its indolent course so as to closely resemble the activity of the virulent soft sore. A free suppuration may be excited, and a more or less deep ulcer is formed, which may be associated with a baggy, œdematous infiltration completely masking the characteristic induration, and under these circumstances might easily be mistaken for a simple chancre. Moreover, the lesion may be the "mixed chancre," when it is often impossible to discover the presence of a syphilitic element until some time has elapsed. It is not usually difficult to ascertain the presence of a chancreous virus, through auto-inoculation and by confrontation, but the more serious question can only be decided by the course of subsequent events.

On the other hand, a simple chancre may under certain circumstances be mistaken for an initial lesion. After cauterization of a soft sore an inflammatory hardness of the base may result that might be taken for the syphilitic induration. A similar effect may be produced when the sore is so situated as to be exposed to frequent irritation from the flow of urine. Again, the nodular thickenings in lymphangitis from inflammation of the urethra might be mistaken for syphilitic induration. According to Fournier, the lesions of scabies on the penis may sometimes resemble the initial lesion of syphilis.

Vaccination Syphilis.—Since the use of “humanized lymph” has been very generally superseded in this country by that of “bovine virus,” vaccinal syphilis has fortunately become a rare occurrence. But it may still occur with “bovine virus” if the instrument used in vaccinating has been recently employed in a syphilitic case and has not been properly cleaned. It is possible that a syphilitic primary lesion, resulting either from inoculation with an unclean lancet or impure lymph, might be mistaken for an ulcerating vaccine lesion. Their distinguishing characters are as follows :

In the ulcerating vaccine lesion the ulcer develops at the site of vaccination from the twelfth to the fifteenth day, and by the twentieth day is at its maturity. If the vaccination has been done at several points, the ulceration generally involves them all. Its appearance is that of an intensely inflamed deep ulcer, with smooth borders and copious discharge. There is usually a hard, inflammatory œdema of the base. The region about is red, sometimes erysipelatous, and the adjacent lymphatics are swollen and painful. It may be attended with considerable fever.

On the other hand, the vaccinal syphilis appears usually after the third week from vaccination, and not before the twentieth day. If there are several vaccine pustules, it rarely affects them all—frequently but one. The appearance is but slightly inflammatory. Often the lesion is covered with a crust. In case it ulcerates the ulceration is less deep than that of the simple vaccine ulcer, and there is the characteristic syphilitic induration at the base, with but little inflammation of the surrounding area. The glands in the vicinity always show the typical syphilitic adenopathy. Finally, the diagnosis is confirmed by the appearance, after the usual period of incubation, of constitutional manifestations. Sometimes a general exanthem follows vaccination, but its acute character, its early appearance (within a fortnight after vaccination), and short duration, together with the general clinical features of the cutaneous lesions, easily distinguish it from the secondary eruptions of syphilis.

Carcinoma of the genitals or mouth might possibly in some cases be mistaken for the initial lesion of syphilis. But the rapidity of evolution and shorter duration which usually characterize the latter as compared

with the former, are points of distinction. Another point is the waxy nodular border of cancer, in which the tissue is even denser than that of the indurated syphilitic lesion. The lymphatic complication also begins earlier in syphilis; and finally the question is settled either by the occurrence of secondary syphilitic manifestations and coincident involution of the initial lesion on the one hand, or on the other by a microscopic examination revealing the characteristic structure of cancer.

A *tuberculous ulcer* in the mouth—as, for example, upon the tip of the tongue—could hardly be confounded with syphilis. Its history, its frequent association with pulmonary tuberculosis, the absence of induration, greater irritability and more inflammatory course, should suffice to distinguish it from the primary lesion of syphilis.

Sometimes an ulcerating *gummy tumor* may bear a certain resemblance to the syphilitic chancre, especially when occurring in a suspicious location, as upon the genitals. But there would probably be the history of a deep-seated nodule that had existed for some time before it finally became softened at the center, opening by a small aperture at the summit like an abscess, and gradually becoming converted into a deep, freely suppurating ulcer. The characteristic adenopathy of primary syphilis would be wanting; at the most, perhaps a single gland, or one on either side, would become inflamed and swollen.

Secondary lesions are less liable to resemble the initial lesion, for the reason that they are almost invariably multiple and disposed in a group of definite form, and when attended by ulceration the ulcer is nearly always serpiginous, healing at one side while it advances at another. Furthermore, such an ulcer would lack the indurated edge and base of the syphilitic chancre.

Pathological Anatomy.—The minute anatomy of the initial lesion does not afford a very satisfactory explanation of its peculiar clinical characters. The microscope plainly reveals a dense cellular infiltration, with round nucleated cells, such as are found in syphilitic lesions at all stages of the disease. These cells, however, do not differ in character materially from the “granulation cells” of inflammatory growths generally. Precisely similar cells occur also in the infiltration of the simple, noninfecting chancre, and have a similar distribution. In the initial lesions the cells are inclosed in a reticulated fibrous structure, and are especially accumulated in the adventitia of the blood-vessels, whose lumina are thereby contracted or entirely obliterated, differing in this respect, it is said, from the simple chancre, in which the vessels remain patulous. At the circumference of the cellular infiltration the connective-tissue fibers form loose œdematous meshes, as they do also in the simple chancre. At the periphery of the eroded surface of the syphilitic lesion the papillæ are enlarged and infiltrated, while upon the surface of the erosion vestiges

of the epidermis remain, with here and there traces of papillæ, together with prolongations of the rete Malpighi.

But there is nothing in these facts to account for the dense hardness of the growth. To explain this characteristic and well-nigh constant accompaniment of the syphilitic chancre various hypotheses have been proposed.

Robin and Marchal (Charité-Annalen, Bd. ix, Heft 1, 1860, p. 139), and also Von Bärensprung, regarded it as due to the presence of an amorphous connecting substance sometimes referred to as plastic lymph. Von Bärensprung believed that the chancre-induration was not to be regarded as merely an inflammatory exudation, nor, on the other hand, did it properly belong to the true neoplasms, since "it is capable of undergoing involution and resorption; it is, indeed, from beginning to end a morbid product resulting from a specific cause, of durable nature and up to a certain degree capable of organization, but afterward at the surface undergoes granular degeneration."

Michaelis (Compendium der Lehre von der Syphilis, Wien, 1859, p. 52) attributes the induration to the production of newly formed connective tissue at the periphery of the growths—a sort of fibrous callus surrounding the infiltration like the capsule of a gummy tumor. It is well known that Virchow represented the earliest manifestation of syphilitic infection—i. e., the initial lesion—as histologically the counterpart of the latest product of the disease, to wit, the gumma. But Virchow considered the morphology of the syphilitic growth as having little significance. It was "only through the mode of evolution and involution, its life-history," that it acquired its distinctive character. Kaposi also admits that from its "histological relations alone the specific character of the sclerosis" could not be inferred.

Von Biesiadecki sought to account for the induration as due partly to the fibrous growth in the œdematous tissue surrounding the lesion, but chiefly to the ischæmic and "dry" condition of the indurated tissue, and this *dryness* was attributed to narrowing of the blood-vessels through the dense cellular infiltration in the adventitia. He did not explain, however, why the same or a similar infiltration in the walls of the blood-vessels in the soft chancre caused no such ischæmia and no induration. Though Biesiadecki admitted a new formation of connective tissue about the vessels, he attached no special significance to this. He found, also, dilated lymph spaces in the sclerosis, which would seem somewhat inconsistent with his theory of "dryness." Their presence was explained as owing to the fact that there was in the case examined a coagulum in a vessel supposed to be lymphatic, the indurated cord upon the dorsum penis, and it was supposed that this coagulum had occluded the lymph channel and caused the dilated lymph spaces. Caspary (Vierteljahrsh.

f. Derm. u. Syph., 1873, p. 45), on the other hand, maintains that these spaces are due to the rigidity of the tissue surrounding them, that prevents their collapsing. Moreover, some cogent reasons are given by Unna for believing that the occluded vessel in the cord of the dorsum was not lymphatic at all, but probably a vein.

In an important contribution to the minute anatomy of the primary lesion, Verson (Virchow's Arch., Bd. xlv, p. 117) very clearly traces the source of the induration to the new-formed connective tissue. The course of events is described as follows: "In the first stage, development of exudation corpuscles, in at first normal tissue, which on account of their location are undoubtedly derived from the interior of the blood-vessels. In the second and third stages the exudation-cells throw out processes that partly remain free and partly anastomose with each other. Thence there is formed a meshwork that through the continual proliferation of new cells undergoing similar changes becomes more and more dense and intricate, and finally sclerosed."

Cornil and Ranvier (Manual d'Histologie pathologique, Première Partie, p. 186, Paris, 1869) also believed that while the cells of the initial lesion were apparently a simple inflammatory product, they were situated in an amorphous or fibrillar substance or groundwork that was the source of the peculiar hardness of the tissue. They considered that this substance was a mark of distinction between the syphilitic chancre and simple inflammatory tissue. Caspary denies that the fibrillar substance which characterizes the initial lesion occurs in the soft chancre, and for the reason that the destructive action is too rapid for it to develop. He also attributes the narrowing of the blood-vessels in the syphilitic lesion to contraction of this new tissue.

The most exhaustive study that has been made of the anatomical changes in the initial lesion is that of Auspitz and Unna (Vierteljahrsh. f. Derm. u. Syph., 1877, p. 161; also Ein weiterer Beitrag zur Anatomie der syphilitischen Initialsklerose von Dr. P. Unna, *ibid.*, 1878, p. 543). By them also the induration is attributed mainly to the connective-tissue growth about the blood-vessels, which is characterized as a true hypertrophy attended with sclerosis. But in addition to this they describe certain important changes, not heretofore mentioned, pertaining to the *epidermis*—changes that do not occur in the soft chancre. Both in the simple chancre and in the syphilitic lesion there is moderate hypertrophy of the interpapillary portion of the epidermis at the periphery of the sores, but in the initial lesion of syphilis the rete was found enormously increased, and far beyond anything that took place in the other. From the under surface of this layer prolongations descended into the cell-growths and formed long processes, either joined in a reticulated form or here and there completely detached from the stratum to which

they belonged, forming isolated blocks of epidermic cells, surrounded on all sides by the round cell-growth. As the latter increased it gradually invaded the epidermic layer, and, breaking through the stratum lucidum, entered the corneous layer and finally appeared upon the free surface, thus producing the eroded or ulcerated appearance of the sore. According to this, the epidermis is not destroyed, as in the simple chancre, and hence the lesion can not properly be called an ulcer.

The hypertrophy of the epidermis is considered by Auspitz and Unna as in some measure accounting for the hardness of the initial lesion. The resistance which it offers to the increasing cell-growth would tend to render the tissue denser and thus augment the induration. Unna explains the contraction of the blood-vessels as sometimes due to inflammatory proliferation of the endothelium, an "*endo-arteritis obliterans acuta*," which is believed to depend upon a previous implication of the *vasa vasorum*. But Unna thinks that it should more frequently be referred to the accumulation of cells in the adventitia and their subsequent sclerosis. The latter form, which he terms *Gefässverschluss durch Infiltration*, is said to be more likely to affect the smaller vessels, while the *endo-arteritis obliterans* is more common in the larger.

Prognosis.—As local affections merely, the lesions of primary syphilis have comparatively little importance. With few exceptions they occasion but little physical discomfort, and are rarely attended with any permanent injury to the particular parts involved. Only in exceptional instances is the ulceration of the initial lesion sufficient to cause any considerable destruction of tissue, and many times there is not even left a scar to mark its site; while suppuration, or any of the ordinary marks of an adenitis, rarely complicate the indolent adenopathy. A "cephalic chancre" may cause annoyance on account of the temporary disfigurement, and if in the throat the discomfort for the time being may be considerable. But it not infrequently happens that the local affections of this self-limited period of the disease run their course and disappear without the patient's having been aware of their existence, and in cases where they attract attention any suffering they cause is usually more mental than physical. It is for intelligent patients a period of suspense, of solicitude for the well-known dangers of which they are but the precursors. The question is naturally asked, Is it possible during this period to forecast the future of the disease?

Of one thing we can be almost absolutely certain, namely, that if the diagnosis has been correct there will be evidences sooner or later of general blood-poisoning; but whether its manifestations will be grave or light is a question that, with our present sources of information, must be answered very guardedly and very indefinitely. We say that it is *almost* certain that evidences of constitutional syphilis will follow. But cases

have been met with repeatedly in which appearances that seemed unmistakably characteristic of primary syphilis have been observed, and yet no signs of constitutional disease have been detected for long periods after. Attention is called to the numerous cases of excision of the initial lesion reported by competent observers, in which apparently subsequent symptoms were prevented. It is futile to say that in all these cases there were mistaken diagnoses. Without here making any comment on the theory of prevention, nor on the question whether it is possible by excision of the initial lesion to prevent general infection, the fact remains pretty clear that for one reason or another primary syphilis is not always or necessarily succeeded by obvious signs of constitutional syphilis. Certainly, so far as the gravity of these signs is concerned, when they occur at all there is between different cases the greatest disparity. So good an observer as the late Sigmund, of Vienna, used to say that forty per cent of the cases of unquestionable syphilitic infection were followed by such slight or evanescent general symptoms, that unless carefully watched for they would escape the notice both of patient and physician, and there is reason to suppose that sometimes they would not be discovered after the most careful watching. Again, on the other hand, some cases from the start to the finish exhibit all the features of a malignant disease. Upon what does this disparity depend? Obviously enough, most of all upon the susceptibility of the individual infected, upon the vital qualities of his organism, upon the resisting power or vulnerability of his tissues.

Sometimes these qualities of the individual are evinced at the very start. In the strumous, the weakly, the cachectic, and the aged the primary manifestations are apt to be severe. Deep ulceration and extensive induration commonly attend the initial lesion; while the adenopathy is often unusually pronounced, and may assume the form of the suppurating strumous bubo. It is admitted by most authorities that a primary lesion that is attended with marked inflammatory characters, œdema, ulceration, or gangrene, commonly betokens a severe course of the disease in the secondary period. *Per contra*, a trifling induration of the primary sore without loss of tissue should indicate a comparatively benign syphilis. Unfortunately this does not always follow. While absence of ulceration in the initial lesion may indicate that the syphilitic virus has comparatively little effect upon the cutaneous structures, and that the consecutive syphilodermata may not be of a severe character, when it comes to a reckoning with other divisions of the organism—the nervous system, for example—the result may be very different and much more serious.

While individual susceptibility is doubtless the main factor to be considered in prognosis, it is not the only one. Allusion has already been made to the fact that in experimental inoculations it has been found that different degrees of inoculability pertain to the syphilitic virus depending

upon the source from which it is derived, that from such recent lesions as the syphilitic chancre or mucous patches being the most potent; that from pustules or ulcerating lesions of a later period being less so; while that from the tertiary lesions can not be inoculated at all. But when infection has actually taken place, whether the severity of the disease in its general course bears any relation to the source of the infective virus, is an interesting but undetermined question. In only one instance can we positively affirm that a special modification in the course of the disease depends upon the source from which it is derived, and that is where the mother of a child inheriting syphilis from the father acquires the disease through the utero-placental blood. It can not be positively denied that in some other instances, where syphilis has been acquired in the usual way, but by inoculation of a feeble or attenuated virus, the resulting disease may be so modified as to run a milder course. Such a supposition is in accord with what we see in epidemics of other infectious diseases. The variation in the severity of the cases occurring in different epidemics can hardly be explained in any other way than by supposing that the poison varies, and is more active, more virulent in one epidemic than in another.

Some writers maintain that the location of the initial lesion has some influence on prognosis. Thus it is said that extra-genital infection, more particularly a "cephalic chancre," is more apt to be followed by severe syphilis than when the inoculation is upon the genitals. The statement lacks sufficient confirmation as well as inherent probability.

Another point to be considered in connection with prognosis is the duration of the primary period. It has been observed in malignant forms of syphilis that the symptoms generally are precocious. Inasmuch as the power of resistance to the poison with which the organism is infected is weak, the manifestations of constitutional disturbance are hastened in their appearance and the stages of latency or incubation are shortened. Likewise has it been observed that when the advent of secondary symptoms is delayed these are apt to be light in character. The relation here implied is far from being a constant one. Other circumstances influence the duration of incubation quite as much, perhaps, as the gravity of the disease. Some of them have been referred to above. Nevertheless, we are justified on the whole in regarding a prolonged primary period as a favorable element in the prognosis; a short duration of this period as an unfavorable one.

The effect of treatment during the primary period of syphilis upon the future course of the disease, though a question of far-reaching importance, is one about which there is the greatest divergence of opinion. It is admitted pretty generally that by antisymphilitic treatment the severity and duration of the local manifestations of the primary period may be greatly modified, and also that by the same means the appearance of the

secondary symptoms may be delayed. By antisymphilitic treatment is meant only such measures or such medication as are designed to affect the course and character of the disease directly, and not those that are merely preparatory or palliative. Now, while it is generally conceded that antisymphilitic treatment in the primary stage may be effective in hastening the involution of the induration and of the local adenopathy as well as in delaying the advent of constitutional manifestations, it is denied by many that the general result is an unqualified advantage. In the first place, there are those who are averse to the early use of mercurial treatment, for the reason that it is apt to derange the normal evolution of the disease and so render the outbreak of symptoms irregular and uncertain, and thereby postpone a confirmation of the diagnosis. The apprehension has been expressed also by some others that, in repressing the outward manifestations of infection, we are risking a more serious implication of internal organs. Thus, Jullien concluded from certain statistics that late lesions of the nervous system, and also of the testicle, were especially liable to occur after mercurial treatment in the primary stage. He states that, while ordinarily the so-called tertiary symptoms occur within the first four years of the disease and after that period are comparatively rare, he found that, in those cases that had been treated with mercury in the primary period, the gravest symptoms occurred from the fourth to the fifth years. He concludes, therefore, that the employment of mercury at the start tends to delay the symptoms, not only of the secondary but of the tertiary period as well; that in some cases it may entirely prevent them, but that when they do occur they are more severe. Diday has published statistics of similar import, though they would tend to show that the early secondary symptoms, as well as the tertiary, are severer in cases treated during the primary period than in those that were not. Of seventy-four cases of syphilitic chancre, forty-nine received no mercurial treatment. In these, secondary symptoms appeared after a mean average period of 43.23 days. In twenty-five treated with mercury, the average period before secondary symptoms was 49.08 days. In the forty-nine cases not treated, the immediately following symptoms were slight in seventeen, moderate in twenty-seven, and severe in five. In the twenty-five treated, the syphilis was slight in six cases, moderate in fourteen, and severe in five. But statistics on such a small scale are notoriously inconclusive and sometimes misleading. There is certainly an inconsistency in the idea that the same remedy, whose constant employment during the years of the constitutional disease is accepted without demur, should be shunned during the month or two of primary syphilis because of supposed dangerous after-effects. This much is pretty certain, at all events, viz., that antisymphilitic treatment during the primary stage of syphilis is not an indifferent factor in the prognosis

of the consecutive course of the disease; that it may to a certain extent retard its symptoms and disorganize its regular course.

THEORY OF PRIMARY SYPHILIS.

What relation do the pathological changes of this period of syphilis bear to the constitutional infection and the general disease? Are the manifestations of primary syphilis merely symptoms of a general infection already an accomplished fact, or do they represent rather a local tissue infection of which the general infection is the subsequent effect through a process of gradual diffusion? The theory which the writer advocates was set forth in a paper (On Preventive Treatment in Primary Syphilis, New York Medical Journal, March 24, 1888) read before the Academy of Medicine a few years ago, and its most essential points as then stated are here reproduced.

All the more obvious signs in the clinical history of the initial stage seem to imply that general infection does not take place immediately, but that there is a temporary sojourn of the syphilitic virus in the region where first implanted. After the virus has been inoculated there ensues a period of apparent quiescence of several weeks' duration, when, little by little, there begins at the inoculated point an indurated growth that essentially consists of inflammatory granulation tissue, answering in its general character to an irritative lesion provoked by the presence of a foreign and disturbing element. This growth is the "initial lesion" of syphilis. Simultaneously with this, or shortly following its first appearance, the nearest lymphatic glands become swollen and indurated in consequence of a cellular growth of a corresponding character to that of the initial lesion. These local manifestations remain for a considerable period the sole evidences of disease, till finally, at the expiration of this period, with more or less sudden onset, the symptoms of general or constitutional syphilis make their appearance.

The simplest and, it seems to me, the most rational explanation of this course of events is that the virus, when first implanted in the tissues, does not immediately pass into the general circulation, or what portion does is insignificant; that, mainly at least, it is at first confined to the spot where the future chancre is to develop; that here, finding a favorable soil, it grows and slowly increases till its intrusive presence becomes a source of offense to the tissue harboring it, and gradually inflammatory reaction results. From this source of generation the virus contaminates, sooner or later, the nearest lymphatic glands, which in turn become other sources of supply, till finally from these multiple foci the whole organism becomes infected. According to this, the main route to the general circulation is by way of the lymphatics and through the *receptaculum chyli*.

To this view Auspitz has opposed certain objections. Within the

initial lesion, he says, the lymphatics show comparatively little change, while the walls of the blood-vessels are commonly implicated and their caliber is often occluded. The so-called "lymphatic cord," that is often felt along the dorsum penis, is attributed wholly to the thickened blood-vessels. Furthermore, it is objected that, between the chancre and the *receptaculum chyli*, the chain of indurated glands has not yet been shown to be continuous and complete.

That the lymphatics in the primary induration are but slightly affected, may perhaps be the very reason why their absorbent function is not disturbed. Through their patent channels the virus would find a way of ingress which is denied it by the occluded blood-vessels. Moreover, the intimate connection of the adventitia with the lymphatic system would easily account for the marked implication of the vascular walls and for the lymphatic cord.

The objection that the lymphatic chain is not continuous is apparently based upon certain pathological specimens, more particularly those in the *Musée de Lourcine*, already referred to. In these cases the lumbar glands were not found enlarged. But it is possible enough, that had the patients lived they would have been affected next, and the process would have been gradually extended to the receptaculum. Or, on the other hand, even should general syphilis supervene before all the glands in order had been affected, it would not prove that the virus had traveled by another route than the lymphatic. It is not the view maintained here that the lymphatic ganglia serve as barriers to the general infection in the sense that they can not be traversed till they are themselves affected and diseased, but rather that each, as it is infected in turn, becomes a new generator of virus, and when all the sources of supply, whether few or many, have delivered more of the poison into the blood than the system can tolerate, it is then that constitutional syphilis declares itself.

Thus far, indeed, the pathological conditions seem to imply that in syphilis the disease advances by way of the lymphatics in a manner that is analogous to the diffusion of the malignant tumors. Whether, however, in syphilis the contamination advances by such regular approaches from one gland to another that any definite interval can be said to exist between the affection of one gland and that of the next in succession, is very doubtful. Usually, as soon as the inguinal adenopathy can be made out at all, at least three distinctly enlarged glands can be felt. Whether several are really affected simultaneously at the start—and, if so, how many—we have no definite knowledge. With regard to the specimens above referred to, we may surmise that the affection of the iliac glands took place subsequently to that of those in the groin, but of this we have no evidence.

In the indications thus far presented we find nothing incompatible

with the supposition that during the primary period of syphilis the disease is localized within the vicinity of the point of inoculation. But the view is enrent among many syphilographers that the manifestations of this period are always anticipated by infection of the general system, of which they are only prodromal symptoms. According to this position, directly upon its inoculation the syphilitic virus passes into the general circulation. The apparent quiescence at the point of inoculation is real quiescence. The incubation pertains not to any *materies morbi* in that vicinity, but to something in the blood, and the initial lesion is the first tangible sign of the blood disease, reflected in some arbitrary and inexplicable manner to the spot where the virus effected its original entrance. It is very strange, it must be observed, that the second transit of the virus through this region should produce such decided effects, while at the first the tissues suffer its passage and betray no resentment whatever.

Two facts are alleged concerning the primary stage of syphilis, upon which the theory of the symptomatic character of the initial lesion is based. The first is, that an individual who has been inoculated with syphilis has always acquired immunity from any subsequent inoculation of the syphilitic virus before the chancre develops; and the second, that extirpation of the chancre does not prevent the regular course of the disease.

That there is a period within a certain time after inoculation when the tissues are not refractory to a second implantation of the virus, is shown by the fact that, when a second or third inoculation takes place within a short period from the first exposure, successive and multiple chancres result. The immunity is therefore not established at once. But it is maintained that, after the chancre has once formed, constitutional infection is an accomplished fact and the immunity is then complete. In verifying this point one important consideration must not be lost sight of, viz., the length of time it requires for the chancre to develop. The second inoculation might have its effects forestalled by constitutional infection intervening before the completion of its incubation, even though at the time of this second inoculation no general infection existed.

It must be admitted as a fact, however, that auto-inoculations and re-inoculations during the primary period of syphilis, as a rule, produce no specific effect except when performed very early. Re-inoculations following the first exposure at a short interval are tolerably sure of being successful, while auto-inoculations from the chancre are very rarely so, and then only, in all probability, when made sufficiently early to allow their periods of incubation to elapse before the advent of the secondary stage of the disease. It may be conceded, furthermore, that in the majority of cases immunity *does* precede what is known as secondary syphilis. From the materials at our command it seems not improbable that a slight degree of

general infection may exist in primary syphilis which, though sufficient to confer immunity upon the individual from any second installment of the virus, is yet insufficient to cause general disease. It does not suffice to arrest the progress of the growth and dissemination of virus at those points where depots have already been established, but it may act as an effective injunction against the establishment of any new depots. We have a notable illustration of such an immunity in the case of the mother of a syphilitic child who, notwithstanding she may at no time present any outward sign of syphilitic infection, is immune from contagion and suckles her child with impunity. Moreover, there is nothing in the view just proposed that does not accord with the results of preventive inoculation which have been achieved, notably by Pasteur, in other infectious diseases. Practically these results depend upon the fact that the infection that is superinduced artificially is in a mitigated form. It may be presumed that the attenuating process to which the virus is subjected before its inoculation so modifies its power of reproduction that when it enters the body it produces itself only to a comparatively slight extent, which, though sufficient to modify the tissues in such a way as to render them insusceptible to another inoculation of the same virus, causes no manifestation of virulence. Is it not possible that in the initial stage of syphilis similar conditions prevail?

It can not be said that the results of excision make conclusively either for or against the hypothesis of the local character of primary syphilis. But even were it shown that extirpation of the chancre did not prevent the course of general infection, it would not thereby be proved that the initial lesion was merely a symptom of the constitutional disease, nor would it prove that the syphilitic process was not essentially local in this period. We must not lose sight of the rôle played by the lymphatics. As a manifestation of primary syphilis, the chancre is hardly of less importance than the indolent adenopathy. That the indurated lymphatic glands in the vicinity of the initial lesion are contributory sources of infection, there is little reason to doubt. Were the initial lesion removed they would doubtless still suffice to contaminate the system. To the production of syphilis it is only necessary that the germs of the disease effect a lodgment somewhere in the tissues. The seed must then take root, and when it once begins to germinate its potentialities for infection may reasonably be supposed to be the same as those of the original implantation at the point first inoculated.

While, then, it can not be affirmed of any period in the course of the malady that the disease is strictly limited to the site of the initial lesion, the proposition that syphilis is essentially a local disease remains still uncontroverted. The periods of incubation preceding and following the development of the chancre correspond to what we may provisionally

term a process of germination that takes place *in situ* and not in the general circulation. During the forming stage of the chancre, during the period of apparent quiescence, and before any changes at the point of inoculation are outwardly perceptible, certain alterations are doubtless in progress: the round cells are accumulating, the walls of the blood-vessels are being infiltrated and occluded, till at length the initial lesion is formed. Meanwhile it is not unlikely that certain infectious elements find their way in small quantity into the general circulation. A few such germs might possibly be at once destroyed or eliminated from the economy, but they would gradually increase as the initial lesion and the affected glands continually added to the supply, and, sooner or later, their influence upon the tissues would be such as to superinduce that condition or modified infection which suffices to secure immunity against reinoculation, but is insufficient to elicit constitutional symptoms. Finally, re-enforced by larger and larger incursions of infectious matter, the virus accumulates in the blood in such excess that the organism, unable to tolerate it longer, reacts with the characteristic manifestations of the general disease.

If the indications have been correctly interpreted in this theory, and primary syphilis is practically a local or rather *regional* disease, its bearing upon the subsequent events of constitutional syphilis is a much more vital matter than it would be were the manifestations of this primary period merely symptoms of a general infection already an accomplished fact. It concerns prognosis not merely as a passive index but as a determining factor.

It is implied in the theory that to produce constitutional syphilis a certain *quantity* of the poison is requisite—far more than that small modicum that is inoculated at the start, more than can be generated in the infected region within a period of time that is usually of some weeks' duration. The more rapid and the more prolific the generation in this region is, the shorter the periods of incubation, and, with much probability, the severer the syphilis. The quantity of poison, then, represents a major factor in the prognosis, though of inferior importance, doubtless, to that of individual susceptibility.

The therapeutic indications that flow from the theory are clear enough, but their practical fulfillment has been found a baffling task. The object aimed at is to so prevent or retard the production of the virus in the infected region that the point of saturation of the blood may never be reached, or at least not until its effect has been forestalled by general immunity. But to accomplish this, all the foci of infection which serve as generators of the virus in the primary period must be acted on together. It has been abundantly shown that extirpation of the one at the *foramen contagiosum*, the initial lesion proper, can not be relied on

to interrupt the disease, and to reach all the others by surgical procedure is impracticable.

Perhaps the task will be an easier one when the properties of the syphilitic virus are better known to us; when we have learned what particular *rôle* is assigned to its formative element (the hypothetical germs), and what to the concomitant ptomaine; when we know what it is that gives the tissues immunity against the effects of syphilis, and whether it is possible by any therapeutic measures to confer this immunity or to promote its acquisition so as to secure exemption from the injurious consequences of the disease.

CONSTITUTIONAL SYPHILIS.

By JOSEPH ZEISLER, M. D.

WHILE the earliest accidents due to the inoculation of the specific syphilitic virus are pre-eminently of a local character, there appear sooner or later distinct signs which show that a general infection of the whole system has taken place; and it is only when such an unmistakable general distribution of the specific poison has become manifest that we may speak of constitutional syphilis. Under this designation are comprised all the various protean manifestations on the integument, in the viscera, in fact in all the organs of the body, which may be produced in the further evolution of the syphilitic process, and which will form the subject of the following pages.

The question, When does syphilis become constitutional? can not be answered with mathematical certainty. Indeed, it involves one of the principal controversies between the so-called unicists and dualists: the former claiming that the so-called secondary symptoms only are sufficient proof for true constitutional syphilis; the latter asserting in equally strong manner that the fully developed initial lesion is already the result of a general contamination of the system. It is not my purpose, and it would lead us into the domain of theoretical speculation, to enter here upon a discussion of this very interesting but still mooted question. Actual practical observation teaches us that long before the appearance of a generalized eruption on the skin, which is usually considered as the classical sign of constitutional syphilis, there are present distinct morbid changes in many organs of the body, which demonstrate clearly that the syphilitic poison has entered the general circulation, that the disease has become constitutional. But this distribution of the virus and its products occurs in a slow, gradual manner; it requires a certain length of time before its multiplication causes a sort of explosion on the cutaneous surface, and this period may justly be called the second period of incubation.

PERIOD OF SECONDARY INCUBATION.

In distinction from all other known infectious diseases syphilis has a second period of incubation, by which is understood the time elapsing be-

tween the appearance of the primary lesion and the advent of the so-called secondaries—i. e., a generalized eruption and its concomitants.

The duration of this period varies within comparatively wide limits. It has been observed to last only twelve days (Gibert, Rollet, and Guentz); and, again, its extreme has been found by Ricord to be even six months. In estimating the length of this period it is of course necessary that no specific treatment should have been administered, and that the time of the appearance of the initial lesion, as well as that of the first manifestation of generalized syphilis, are carefully noted. Diday, who thus recorded fifty-two cases (*Nonvelles Doctrines sur la Syphilis*), found its average duration to be forty-six days. Extensive statistics made by Guentz furnish the same result. Judging from a great number of observations, the period of secondary incubation may be stated to last, as a rule, about six weeks. Various influences may cause exceptions of this rule. Thus Sigmund (*Wiener med. Wochenschrift*, 1878, No. 21) found that in older people the secondary eruption may be delayed by from three to four weeks. On the other hand, it has been found that all such factors which tend to cause so-called malignant syphilis—as, for instance, lymphatic habitus, scrofulosis, defective nutrition, pregnancy, chronic alcoholism, carelessness, dissipation, etc.—may also accelerate the onset of the consecutive symptoms.

It might be mentioned in this connection that, according to Keyes's observation, the whole period of secondary syphilis may in some instances be skipped, and that only after a very long interval, sometimes lasting for several years, is the chancre followed by tertiary symptoms. These are, of course, extremely rare cases, but, coming from such a reliable source, can not be confounded with the many cases where the appearance of mild secondaries has simply been overlooked by the patient, or even by the physician. Nor should we forget that the early administration of anti-syphilitic treatment is so often responsible for the delayed appearance of constitutional symptoms.

It has been stated already that during the period of secondary incubation a slow and gradual dissemination of the syphilitic poison takes place in the general system; but the channels through which that poison travels, starting from its original abode, the chancre, are not absolutely known. Auspitz believed that the peculiar endarteritis found by him and Unna in the chancre pointed to the blood-vessels as the way of propagation, and that the implication of the lymphatics is already the result of the general intoxication. But E. Bumm (*Viertelj. f. Derm. und Syph.*, 1882, p. 259) remarks, very justly, that the endarteritis, the clogged condition of the small blood-vessels, rather acts as an impediment against the progressive march of the infectious material, while the widely open lymphatic spaces allow its easy passage. It might appear very plausible to

assume that from the seat of the inoculation the virus wanders to the neighboring lymphatic glands, causing the typical indolent bubo, and that in turn the more remote glands are successively invaded by way of the lymph-vessels until the ductus thoracicus is reached, through which the poison enters the general circulation. But more recent careful examinations, to which special reference will be made later on, show that, long before the general lymphadenitis is established, distinct morphological and chemical changes are manifest in the blood. It is therefore most probable that lymph-vessels and blood-vessels, both, furnish the road through which the specific virus reaches the system at large.

PRODROMATA.

The gradual intoxication of all the tissues of the body is accompanied by sufficiently distinct clinical signs, which at first being hardly noticeable, become toward the end of the incubation period so pronounced as to constitute the so-called prodromata of syphilis.

True enough, many patients reach the stage of a generalized syphilitic eruption without having experienced for a moment the slightest indication of being sick, and in some cases it is only then that their attention is called by the physician to the existence of the chancre; but these are exceptions. As a rule, the first two or three weeks after the manifestation of the primary sore are free of characteristic clinical features. After this, and particularly during the two or three weeks preceding the appearance of the exanthem, a number of subjective and objective symptoms become quite marked. The cutaneous integument shows a sallow, pale, leaden appearance; the expression of the face is sorrowful; the eyes look tired as from dissipation or deep grief; the patient feels uncomfortable, unhappy, dejected. His sleep is disturbed; the appetite diminished or lost—occasionally, however, increased to a sort of “bulimia”; indistinct rheumatoid pains in the bones and muscles, particularly toward night, or a general lassitude, are often complained of. Headache is a frequent symptom. It may be continuous and of slight severity, but more often becomes so painful toward night as to keep the patient awake. This is the nocturnal cephalalgia so characteristic of this period. The seat of the headache is frequently the frontal region, or again it may be confined to the occiput; occasionally it reaches from one ear to the other over the vertex, or there is a feeling of painful constriction around the head. These headaches assume often a quotidian type, beginning at a stated hour during the evening and vanishing toward morning. So typical is this occurrence at times that one might be inclined to combat the pain by quinine and the like, but it is only the general constitutional treatment which brings relief. Lang (*Viertelj. f. Derm. und Syph.*, 1881, p. 461)

has shown that in many cases this headache, accompanied by vertigo, nausea, and similar subjective symptoms, can be traced to meningeal irritation, which is manifested through the ophthalmoscope by a marked hyperæmia in the retina, though there is no apparent disturbance of vision. These observations were fully confirmed by Schnabelc. Other neuralgic pains are occasionally observed, particularly in localities which previously were the seat of some irritation (Vajda, *Viertelj. f. Derm und Syph.*, 1875, p. 147).

As more unusual features might be mentioned a painful swelling in the frontal region, the parietal bones, or the clavicle; effusions in the knee and elbow joints, or some of the smaller ones, as the phalangeal joints—features which may closely simulate acute articular rheumatism, but are quite refractory to treatment based on such a diagnosis.*

These premonitory symptoms are usually accompanied by changes in the temperature and the pulse. Of these we shall speak separately later on, as well as of the general lymphatic engorgement.

As in some other infectious diseases, an enlargement of the spleen has been observed toward the end of the incubation period; it is by no means a common occurrence, but sufficiently frequent as not to be regarded as a mere casual coincidence. A. Weil (*Centralblatt f. d. med. Wissenschaften*, 1874, No. 12) reports three cases of recent syphilis wherein he determined the splenic tumor by percussion and palpation. Avanzini (*Viertelj. f. Derm. und Syph.*, 1884, p. 379) noticed it previous to the eruptive stage in eight out of thirty cases. Woelfert (*Monatsh. f. prakt. Derm.*, 1891, p. 81), however, observed it in only sixteen out of four hundred and ninety cases. Schuchter, Wever, and M. Zeissl also furnished several observations. The enlargement takes place either gradually, or, during a fever paroxysm accompanying the eruption, more abruptly, and sometimes causes a painful sensation. Under constitutional treatment the swelling is promptly reduced. We may well look upon the splenic swelling as an analogon to the general ganglionic enlargement.

Another rather unusual symptom associated with early constitutional syphilis is hepatic icterus, which, according to Engel-Reimers (*Monatsh. f. prakt. Derm.*, 1892, xv, No. 10), has been observed in about two per cent of all cases. Ricord first mentioned it in his *Clinique Iconographique*, and Gubler, Lanceraux, Fournier, Hutchinson, and recently Chapotot, have reported well-observed cases. The liver is found to be slightly enlarged,

* It is a strange coincidence that just at the time of this writing I have the opportunity to observe, for the first time in my experience, a classical case of this kind. A young man recently infected, in whom an effusion took place into the bursa olecrani some weeks ago, shortly before the appearance of a syphilitic roseola; the swelling became quite marked and painful, and finally the exudate, consisting mainly of synovial fluid, made its way through the skin, exposing the synovial membranes.

but occasionally the swelling is quite considerable. It is painful to pressure. The fæces are clay-colored, which distinctly points to a biliary congestion.

The cause of this jaundice has been the subject of much dispute, but Lanceraux's explanation seems most plausible. He declares it as the result of the compression of the ductus choledochus through enlarged portal glands. This has been verified by a few *post-mortem* examinations. Syphilitic jaundice yields very readily to mercurial treatment.

Albuminuria also has occasionally been observed during this period, though authors differ very much as to its pathognomonic importance. Since Fournier reports that for two years a careful analysis of the urine was made in all his patients affected by recent syphilis, and that albumin was found in only one case, we may well conclude that it is too uncertain and rare a symptom to deserve more than perhaps a scientific interest.

The same may be said of the observations of Finger (Viertelj. f. Derm. und Syph., 1881, p. 255), who found an accentuation of the cutaneous and tendon reflexes shortly before and during the appearance of the cutaneous eruption. He concludes therefrom that very early during the syphilitic process the central nervous system participates in the general intoxication of the system. And there are some other similar observations which lend weight to such opinion. Bulkley (Archives of Dermatology, 1879) and Fournier noticed that at this early period, particularly in women, there were distinct changes in the sensibility of the skin—a generalized or localized paræsthesia and even complete anæsthesia, or, again, analgesia of different grades of severity.

We may well raise the question here, What is the pathological basis of all these prodromal symptoms and conditions? Assuming that syphilis is a disease due to the invasion of a specific organism—a fact not absolutely proved, but at least highly probable—does it seem likely that those rather uncertain and ephemeral alterations in the general economy are already the result of the topical effect of bacteria? This seems hardly probable. But modern bacteriology teaches us that, besides the direct local action of microbes, we must also take into consideration the effects of their tissue changes, their chemical products, the different ptomaines and toxins, leucomaines, etc. Finger has shown, in an admirable paper (Arch. f. Derm. und Syph., 1890), how all the manifestations of syphilis can be traced on the one side to the direct topical effect of the supposed microbes, or on the other side to the remote effect of their chemical products; and to these latter he attributes all the prodromal symptoms. This may seem only theory, but it surely is a plausible one, and explains in a natural manner the pathology of the incubation period.

STATE OF THE BLOOD.

The general character of the syphilitic process has long ago pointed to the fact that the blood takes part to a considerable degree in the morbid changes which in other organs are so apparent. The experience that the blood of a syphilitic person could become the carrier of contagion contributed in no small degree to that theoretical presumption. Our knowledge of its finer chemical and morphological alterations in this disease are, however, of rather recent date. But although modern histological researches have taught us a great many new facts concerning the condition of the blood in syphilis, we have not found in it, up to this date, the true *materies peccans*.

The first thorough work in this direction was undertaken in 1844 by Grassi, a pharmacist in the Hôtel Dieu, under the instigation of Ricord (*Leçons sur le Chancre*, 1860). He found a diminution of the red blood-corpuscles, which was especially marked in the case of women; he observed it already in an early stage of the disease, and noted the improvement under the use of iodides. His results were confirmed by several authors, notably by Wilbouchewitch (*Brown-Séquard's Archives de physiologie*, 1874) and Keyes (*Transactions Int. Med. Congr.*, Philadelphia, 1877, p. 726), who called special attention to the beneficial influence of what he termed the "tonic dose" of mercury. Later investigators referred particularly to the condition of the hæmoglobin. Of the large number of workers who published special monographs upon the subject within the last few years may be mentioned Lezius (*Blutveränderungen bei der durch Syphilis bedingten Anaemie*, Inaugural Dissertat., Dorpat, 1889), Carl Dehio (*Petersburg. med. Wochenschr.*, 1891, No. 1), Bieganski (ref. in *Monatsh. f. prakt. Derm.*, 1891, p. 345), Luige d'Amore, *ibid.*, 1892, p. 417), I. I. Antz (ref. in *Annales de Derm. et Syph.*, 1891, p. 237), and Stoukovenkoff (*Annales de Derm. et Syph.*, 1892, No. 8). The examinations referred to by this latter author were conducted by his assistant, Dr. Jellenew, in a very careful manner, on twenty patients in different stages of syphilis, and an abstract of his conclusions is given in the following:

A. PERIOD OF INCUBATION.

1. The modifications in the quantity of the oxyhæmoglobin, the red and the white blood-corpuscles are observed long before the appearance of any cutaneous eruption (for instance, twenty days before).

2. As a rule, the decrease in the percentage of the oxyhæmoglobin is evident during the whole duration of the second period of incubation (in sixteen out of twenty patients).

3. The number of the red blood-corpuscles diminishes in proportion

to the oxyhæmoglobin, ordinarily a few days after this has commenced to decrease.

4. The increase in the number of the white blood-corpuscles takes place during the period of second incubation. This may be the first manifestation of the syphilitic dyscrasia in the blood, and precedes usually the decrease of the oxyhæmoglobin and the red blood-corpuscles.

5. These alterations in the blood appear in greater intensity during the fever paroxysms which occasionally announce the cutaneous eruptions, and may be considered as a sort of aura or foreboding.

B. PERIOD OF SYPHILODERMATA.

6. In the course of the syphilitic eruptions (roseola, papules, pustules) the percentage of the oxyhæmoglobin and the red blood-corpuscles continues to diminish in the measure that the white blood-corpuscles increase in number.

7. Whenever the eruption is accompanied by fever the decrease of the hæmoglobin is more evident—about four to six per cent. The diminution of the hæmoglobin and the red blood-corpuscles remains stationary and at its maximum point during the whole period of the eruptions; but they may decrease still further, if no specific treatment is administered. With the gradual disappearance of the cutaneous symptoms, the percentage of the hæmoglobin returns by and by to its normal state; but it may decrease again, even independently of any new manifestations of syphilis.

8. Where no specific treatment is administered, and when repeated outbreaks follow the original eruption, a new decrease in the oxyhæmoglobin can be observed.

9. During the whole duration of the eruptions the quantity of the red blood-corpuscles is diminished. This is most marked during the first days of an eruption, and whenever such an eruption is most intense.

10. The decrease of the oxyhæmoglobin and of the red blood-corpuscles is always proportionate.

11. Before a relapse of the eruption, especially when fever is present, the number of the blood-corpuscles decreases, even more so than during the original eruption.

12. In untreated cases it is rare to observe an increase in the number of the red blood-corpuscles after the vanishing of an eruption.

13. The number of the white blood-corpuscles is doubled in all cases during the cutaneous eruption. Occasionally the increase is still more marked.

14. This increase of the white blood-corpuscles sometimes takes place very rapidly during new outbreaks or during an exacerbation of an eruption, even when no enlargement of the superficial lymphatics can be detected.

15. During the disappearance or after the attenuation of the eruption, no distinct changes are noticeable in the relative number of the white blood-corpuscles in cases treated by daily subcutaneous injections of the benzoate of mercury.

16. Six to seven hours after the first injection of this kind there is a constant increase apparent in the percentage of the oxyhæmoglobin and the number of the red blood-corpuscles, as well as a decrease in the number of the white blood-corpuscles.

17. Under the influence of the first six to sixteen daily injections the percentage of the oxyhæmoglobin becomes gradually normal; in cases, however, which are complicated by fever, diarrhœa, etc., it decreases in spite of such treatment. The continuance of the injections beyond the number of sixteen is always followed by a gradual decrease of the hæmoglobin.

18, 19. Similar observations were made concerning the red blood-corpuscles.

20. After the cessation of the mercurial injections the number of the white blood-corpuscles decreases usually, but later on it increases again.

Two valuable contributions to the subject were made during the recent Dermatological Congress, held at Vienna, September, 1892, one by Konried, on the quantitative changes in the blood of syphilitics, the other by Rille, on the morphological changes. The investigations of Konried strengthen very much some of the above-quoted statements, and emphasize the decrease of the tinctorial power of the blood by ten to twenty per cent, before any change in the number of the red blood-corpuscles is noted, and long before the advent of apparent generalized symptoms. Even robust individuals showed these alterations. With the progress of the disease the amount of the hæmoglobin continues to decrease, even after mercurial treatment has been instituted. Only with the disappearance of the florid manifestations on the skin, and after twenty-five or thirty mercurial inunctions, the hæmoglobin reaches normal figures. A continuance of this treatment, however, produces in most cases by no means an improvement; on the contrary, the color index of the blood shows another decrease, which must be regarded as the result of the destructive effect of too large doses of mercury. In the later periods of the disease grave manifestations may be associated with such enormous decreases in the amount of the hæmoglobin as forty-five per cent; and in such cases proper specific treatment and ideal hygienic conditions may perhaps tend to increase the number of the red blood-corpuscles even to normal figures, but are unable to perceptibly improve the quality of the blood as regards its tinctorial constituents.

These serious alterations are also noticeable in cases of tertiary syphilis which had not been treated; but in general the blood suffers less in

tertiary syphilis than in other organs, though its morbid changes are of a more lasting character. Komried concludes from his researches that the principal alteration of the blood in syphilis constitutes an oligochromæmia.

Rille supplements these results, and shows that with the appearance of cutaneous phenomena and the generalized lymphatic engorgement there is a distinct increase of the leucocytic elements. He found—

1. Increase of both varieties of the so-called leucocytes.

2. Increase of the eosinophile cells, particularly during a papular eruption. Their number corresponds with the extent of the efflorescences on the skin.

3. Considerable increase of the transitory forms and the large mononuclear leucocytes.

4. As an inconstant appearance he found, especially in very pale female-subjects, the so-called myeloplæques, or Cornil's myelogenic cells.

These alterations improve with the disappearance of the cutaneous symptoms and under proper treatment. He attributes the presence of the eosinophile cells, among other causes, particularly to the lesions on the skin, which appears quite plausible from analogous results in different nonspecific skin disorders. The other changes are explained through the lymphatic implication, as well as the insufficient nutrition of the system.

We see from the foregoing observations that the pathological condition of the blood in syphilis is somewhat complex. We find features in it characteristic of oligocythæmia, and again such which are present in leucocytosis. Finally, the changes in the tinctorial elements of the blood are indicative of chloræmia or oligochromæmia.

There is nothing in these conditions that can be called absolutely characteristic of syphilis, but they demonstrate clearly the active participation of the blood in the syphilitic process; and the above investigations show the beneficial influence of specific treatment upon the same, and ought to forever establish the fact that the period of second incubation belongs essentially to constitutional syphilis.

SYPHILITIC FEVER.

It has been mentioned already that elevations of the temperature constitute a frequent prodromal symptom in syphilis. During the further progress of the disease syphilitic fever occurs also quite often. It has been the subject of considerable investigation, and among the authors who furnished the most valuable results may be mentioned Fournier, Lancraux, Bäumler, Bumstead and Taylor, and more especially Guentz and Vajda. While the existence of genuine syphilitic fever is generally

admitted, it is by no means a constant symptom in all cases. Its occurrence, and still more its intensity, seem to depend very much on the co-existence of local morbid processes in different parts of the body. Whether the syphilitic virus, as such, is capable of directly producing fever is by no means settled. From clinical observations this would seem rather doubtful, for its absence during the earlier part of the incubation period, and often during the florid stage of the disease, is contrary to such a view. It seems more natural to look upon syphilitic fever as a symptom depending upon other manifestations. In this way we can understand that syphilitic fever usually accompanies or precedes in a very marked degree the first outbreak of cutaneous syphilis; that it often shows itself again with every renewed eruption on the skin during the whole course of the disease; that ulcerative and pustular lesions go along with higher temperatures than papular ones. In how far ptomaines and toxins may be responsible for the production of fever can not be ascertained in our present state of knowledge.

Guentz has expressed it as his opinion that syphilitic fever is found in only twenty per cent of all cases of syphilis. This estimate is surely too low, for careful thermometrical measurements will reveal more or less increase of the temperature in a large majority of all such patients at one or another period during the disease. The fever may, however, be so slight, and what is more important, may be associated with such trifling subjective complaints, that it is easily overlooked. In other cases it may again be so intense, and by its type simulate other febrile diseases in such a striking manner, that errors in the diagnosis are by no means rare. I myself have met with several cases which were regarded and treated as typhoid fever for quite a while before the generalized eruption at last cleared up the scene. Such errors are quite pardonable, when we remember how apt our patients are, even those in the better walks of life, to conceal a venereal sore before their physician, thus justifying the old Latin proverb, "*Omnis syphiliticus mendax.*"

Concerning the type of syphilitic fever, Fournier distinguishes three principal forms: 1, intermittent type; 2, continued type; and 3, vague, irregular type. He also mentions a kind of syphilitic typhoid. The first two forms are those most often met with.

Fever occurring during the earlier part of the incubation period is, as a rule, only a concomitant of suppurative or phagedenic processes about the chancre or the corresponding bubo. The classical form of syphilitic fever occurs as a precursory symptom of generalized cutaneous manifestations, and has been termed by Guentz the eruption fever. It usually shows a continuous type. Vajda observed it even ten to twenty days prior to the eruption, and Yeo mentions temperatures of 104° to 106° Fahr. several weeks before, but Fournier limits this to a much shorter

term. Only in rare cases the fever reaches over 104° ; usually it keeps itself at about 101° to 102° Fahr. The evening temperature is, as a rule, about one degree higher than that in the morning. With the advent of the cutaneous eruption the fever reaches its acme, and then decreases either gradually or even abruptly. The general symptoms accompanying it have mostly been mentioned under the head of Prodrómata. The eruption fever is usually more marked in weak and debilitated subjects, and, as Fournier first pointed out, more so in women than in men.

Of the fever occurring later on it may be said, in general, that its intensity shows an indirect proportion to the period of the disease—i. e., the longer the syphilis has lasted the milder will be the fever. Recurrent cutaneous manifestations are announced by only a slight rise of the temperature, not more than one to two degrees.

The papular syphiloderm is neither at its outbreak nor during its further existence associated with much febrile disturbance; only the outcropping of new lesions may cause a rise of the temperature by about two degrees. The pustular syphilide, however, is almost always accompanied by considerable fever of a distinctly remittent type; it may reach toward evening 102° to 104° , and is reduced in the morning by about one to two degrees. This higher and more intense fever finds sufficient explanation in the fact that the pustular syphilide occurs, as a rule, only in miserable, ill-fed, cachectic subjects.

Complications on the part of the mucous membranes, swollen or ulcerated tonsils, suppurating lymphatics, or the formation of abscesses in any part of the body, will naturally produce considerable febrile reaction.

During the later stages of syphilis, particularly the so-called tertiary period, fever is rather uncommon, and, as will appear from the previous remarks, is then usually a concomitant of some local destructive process.

Little attention seems to have been paid, up to now, by authors, to the existence of fever in hereditary syphilis; some make no mention of it, others speak even of subnormal temperatures. In a recent paper on the subject, I. Erös (Monatsh. f. prakt. Derm., 1891, p. 420) states that in the newborn the development of specific lesions on the skin and mucous membranes is accompanied by simultaneous fever of a continuous or intermittent type. It reaches from 100° to 102° , rarely more.

The pulse in syphilitic fever is not always in proportion to the temperature, and its rate rarely reaches over 110 per minute.

The diagnosis of syphilitic fever ought to offer little difficulty to the careful and observing physician.

In the treatment, the ordinary antipyretics will be found rather ineffective, while mercury exercises a remarkably beneficial influence, particularly in the earlier periods of the disease. This prompt controlling influence of mercury upon syphilitic fever is perhaps the reason why a

few observers are somewhat skeptical as to its existence, particularly those who are in the habit of beginning the treatment very early and thus disturb the natural evolution of the disease.

In his monograph on syphilitic fever (Viertelj. f. Derm. und Syph., 1875) Vajda has paid particular attention to the tissue metamorphosis in syphilitic subjects. Contrary to expectations, he found very few noteworthy changes in the urine, at least nothing that in any way could be claimed as characteristic of syphilis.

AFFECTIONS OF THE GANGLIA.

One of the most important symptoms of constitutional syphilis, one which in doubtful cases is often the decisive factor for the diagnosis, is the swelling or infiltration of lymphatic glands in certain typical localities near the surface of the body. We do not refer here to the peculiar isolated glandular induration near the seat of the infection—the indolent bubo; this has been treated of in a preceding chapter. We speak here of the more universal glandular engorgement which is a later and more characteristic feature of the disease. It occurs, as a rule, toward the latter part of the period of secondary incubation, sometimes even two to three weeks before the appearance of the cutaneous eruption. At first indistinct, and gradually becoming more marked, this glandular swelling shows itself at its height of development with or soon after the eruption on the skin. It is surely one of the most frequent symptoms of generalized syphilis, and Ricord called it the most constant, the earliest, and the most characteristic sign. A careful examination will rarely fail to discover it in florid cases in some places at least. While there are good reasons to believe that the whole lymphatic system participates in the general infection, the theoretical supposition that all the different glands should be in a state of pathological alteration is by no means borne out by clinical observation. The intensity and extensiveness of the glandular engorgement depend upon several circumstances. Individual disposition surely plays no small part in this. We know that some persons develop lymphatic swellings from trivial causes—a slight traumatism, irritation of the skin through scratching on account of some skin trouble, slight angina, etc. Such patients will surely respond to a syphilitic infection with a marked lymphadenitis. The degree of severity of the disease in general is another determining factor. With a very excessive cutaneous eruption, with ulcerations in the throat, with marked cachexia, we shall almost invariably find very pronounced glandular trouble. By this we wish by no means to convey the idea that lymphatic engorgement is only a symptom, a reaction following, or depending on, a morbid process in a neighboring part. Such statements have—to our mind erro-

neously—been made even by such authorities as Diday and Auspitz. They are untenable on account of the undeniable fact that, as mentioned before, the glands are often affected long before the eruption is present. And we have observed two cases of unmistakable syphilis without any cutaneous manifestations whatever, but sufficiently clear through the chancre, the generalized lymphatic engorgement, and an alopecia.

The glands most commonly affected are those situated around the neck, particularly those on the posterior border of the sterno-cleido-mastoid muscle, the jugular and supraclavicular, the axillary glands, and those inguinal glands which were not primarily infiltrated. Sigmund used to attribute particular diagnostic significance to the enlargement of the epitrochlear glands. These are situated two or three fingers above the internal condyle of the upper arm in a sulcus between the biceps and triceps muscles; usually there is only one gland to be noticed, but sometimes two, or even three, united by intervening indurated lymphatic chords. Taylor doubts the pathognomonic importance of these glands, and Dietrich (ref. in *Viertelj. f. Derm. und Syph.*, 1888, p. 309), who made careful statistical observations on the condition of the ganglia in syphilis, found them in only seventy-two per cent of his cases. Gruenfeld (*Wiener Med. Presse*, 1876, No. 10), again, who made a special study of this question, confirms Sigmund, and claims to have found them without any exception at certain periods of the disease. It is perhaps well to remark that the palpation of the cubital glands requires some degree of dexterity; it is necessary to bend the arm in the elbow-joint, slightly adducting it, and to feel for the glands by placing the hand around the outside of the upper arm and gently inserting the finger-tips into the sulcus.

It is quite common to find ganglionic enlargement behind the ears, one or two glands firmly attached to the posterior border of the mastoid process. The submaxillary, the submental, the occipital, and the femoral glands are also quite often in a state of tumefaction. In rare cases the intervening lymph-vessels may be found in a state of induration, according to Koebner.

These glands attain the size of a small pea to that of a hazelnut, but occasionally get as large as a pigeon's egg. In well-pronounced cases they are not only easily felt, but may be noticed even at a distance as small protuberances. This is especially the case in patients with a thin adipose layer. In those with a rich panniculus it is sometimes quite difficult to find them, even by careful searching. They are always quite painless, indolent, and only upon strong pressure a disagreeable sensation may be created. They are roundish or ovoid, and usually movable beneath the skin. They remain in this state of engorgement during the florid stage of the disease, and gradually terminate in perfect resolution. Mercurial treatment is a powerful aid to make them disappear along

with the other symptoms of syphilis. Only in exceptional cases one or another gland, most often the inguinal, will remain enlarged even for years. Suppuration of syphilitic ganglia is a very rare accident, and is then brought on not by the original disease, but by complicating scrofulosis or some form of extraneous local infection.

The diagnostic value of ganglionic enlargement is quite considerable, but is often overestimated. The presence of numerous palpable glands in connection with other important signs of syphilis forms strong positive evidence. But their absence can not be used as equally strong negative evidence, for we have seen that they occur regularly only in the latter part of the incubation period and the directly following active stage of the disease. To look for them in later periods, particularly when tertiary forms are manifest, with a view to strengthen the diagnosis, is at least useless; and we have never a right to declare that a patient is free from syphilis, on account of our inability to detect anywhere the slightest trace of former glandular swelling. On the other hand, it is perhaps a still greater mistake to base the diagnosis of syphilis on the fact that one or another isolated gland is noticeably enlarged; for it should not be forgotten that in otherwise healthy persons a careful examination will very often reveal some enlarged ganglion as a residuum of some former nonspecific trouble. Dietrich has through his above-mentioned investigations reached the surprising result, that of 439 healthy subjects which formed the basis of his statistics, 99 per cent had perceptible glands in one or another part of the body. He could feel the cervical and supraclavicular glands in 79 per cent, the axillary glands in 72 per cent, the cubital glands in 82 per cent, and the inguinal glands in 93 per cent. If we remember how frequently infantile eczemas and many other skin diseases, affections of the throat, gonorrhœa, and a host of other troubles are associated with and leave behind them more or less glandular swellings, we shall not much wonder at these figures.

The differential diagnosis of ganglionic enlargement in syphilis from that in other affections will rarely offer much difficulty. Scrofulous glands have not the smooth, even surface of syphilitic ones. They are apt to become inflamed and tend to ulceration. The glands in Hodgkin's disease form massive tumors. Those in prurigo are easily recognized from the co-existing skin affection, and they are, as a rule, found only in the subinguinal and femoral regions.

We have already indicated our opinion as to the pathological importance of this specific glandular engorgement. It is by no means the result of a sympathetic irritation induced by morbid processes in their proximity, but is the effect of the general specific intoxication of the whole system. Those ganglia are a sort of metastasis of the initial lesion. Such a view is quite plausible in the light of Bunn's investigations, who suc-

ceeded in producing syphilitic infection by inoculation with the milky substance from one of those glands. It has furthermore been proved by several post-mortem examinations (Lancereaux, Finger), that far away from any source of external irritation visceral glands are found similarly affected as those near the integument. The deep inguinal, the iliac, the retro-peritoneal, prævertebral, mediastinal, and bronchial glands have been found to participate in the general lymphadenitis. As a rule these deeper ganglia, while often found present in the early stage of the disease, are pre-eminently characteristic for the later periods, and in a certain way they have a similar relation to visceral syphilis as the superficial ganglia have to the affections on the skin and mucous membranes.

It has been claimed by Virchow and others that the aforesaid ganglionic enlargements act as sorts of depots, from which at times the stored-up virulent matter is distributed into the general economy. Such a view might appear quite rational, and might offer a theoretical explanation for the mode of propagation of the specific poison, for the frequent relapses peculiar to syphilis, and for its chronicity; but it does not harmonize with exact clinical observations; for the softening and gradual disappearance of the ganglionic enlargement, which according to that theory ought to facilitate the dissemination of the poison, by no means causes an aggravation of the other symptoms, but, on the contrary, rather indicates and is justly considered as a very desirable sign of general improvement. It is somewhat doubtful whether the general lymphadenitis bears a causal relation to the leucocytosis peculiar to certain periods of syphilis. The above-mentioned observations as to the state of the blood by Stoukovenkoff (particularly No. 14) do not strengthen such a view, reasonable as it may appear.

The anatomy of these engorged glands shows as the essential feature a small cellular infiltration into the lymph spaces and a slight hypertrophy of the interalveolar connective tissue, which explains their density. On a section they are of grayish-white or reddish-white appearance. Their resolution takes place through fatty metamorphosis of the cellular contents and a shrinkage of the connective tissue, while the capsule remains practically unchanged. This resolution is macroscopically noticeable by a change from the roundish shape to a spindle form. We fail, therefore, to observe any pathological state in these glands which can be regarded as pathognomonic of syphilis.

Quite different from the generalized lymphadenitis in its symptoms and pathology is a form of localized gummatous affection of the ganglia, occurring as a rather unusual manifestation in the later periods of syphilis. This gummatous bubo has been made the subject of an excellent monograph by Lustgarten (*Med. Record*, 1890, No. 2), to which we refer the reader for further particulars.

SYPHILITIC CACHEXIA.

By syphilitic cachexia is understood the profound alteration of the blood and the resulting chain of general symptoms which are noticeable at different periods during the course of syphilis. Fortunately, with our modern, improved methods for treating the disease we have very rarely occasion to observe those historical cases of utter physical deterioration; and whatever we do see of it may with few exceptions be safely put down as the result of insufficient, negligent, improper, or no treatment at all.

From the preceding remarks on the morphological changes of the blood it will be seen that during the latter part of the second period of incubation we have a true chloro-anæmia and leucocytosis which is productive in most cases of certain characteristic signs of a general cachexia which were mentioned under the heading Prodomata. A similar condition of anæmia, though less marked in its systemic effects upon the patient, may be observed during the whole period of the syphilodermata, particularly in such patients as were already before of a weak, debilitated constitution. Frequent headaches and nocturnal pains in the bones—the so-called osteocopic pains—are significant of this form of cachexia. Although it is usually amenable to proper treatment, we meet occasionally with those cases of malignant or galloping syphilis in which the cachexia becomes so alarming, that even the most painstaking management can hardly prevent fatal results.

In long-protracted and severe cases, those who enjoy only short intervals of latency, but are characterized by frequent relapses, after long-continued ulcerative processes on the skin, under the combined influence of other constitutional diseases and of serious visceral affections, there results a chronic adynamic condition peculiar to the tertiary or late stage of syphilis—*tertiary cachexia*. Tuberculosis, scrofulosis, rickets, hæmorrhagic diathesis, alcoholism, are among these constitutional causes. Morbid processes in organs whose physiological function is important for the general nutrition and the regeneration of the blood, as the liver, spleen, kidneys, the intestinal tract, the deep lymphatic glands will naturally favor such a cachexia. It will be seen from later chapters of this work of what nature these visceral affections are. Their influence upon the blood results in a grave form of chloro-anæmia, occasionally even a sort of pseudoleukæmia. This latter condition is probably in no small degree due to chronic pathological changes in the deep ganglia (lymphatic leukæmia), or to affections of the spleen or the bones (myelogenous leukæmia).

The general symptoms accompanying this tertiary cachexia are in no way typical, but resemble in many respects those observed after other chronic wasting diseases. The complexion of the patient becomes pale

and leaden; the skin is thin and flabby; his digestion is impaired; all life energy seems to be gone; the sleep is disturbed by osteocopic pains. The patient complains of palpitations of the heart, and vertigo; he is exceedingly nervous. All these symptoms may improve under careful tonic treatment, change of surroundings, and ideal hygiene, unless amyloid degeneration of important visceral organs has gone so far as to exclude the possibility of restoration. According to Fournier, women are more liable to develop these serious forms of cachexia. Besides chloroanæmia he mentions another form of cachexia in women which he terms "asthænia." In this condition there are no outward signs of anæmia, but the general debility and prostration are very marked and often of an alarming character.

Syphilitic cachexia is particularly characteristic and especially frequent in the hereditary form of syphilis.

We must not overlook the fact that the excessive and injudicious use of mercurial preparations is to no small extent responsible for what frequently appears under the picture of syphilitic cachexia. We have seen above, from the investigations of Konried, that the hæmoglobin suffers greatly from too large mercurial doses, and we can understand what deleterious influences those enormous quantities of mercury must have had, which were the rule of treatment in former times, and even up to our modern times, where more rational methods have been formulated.

TRAUMATISM AND SYPHILIS.

The relations of traumatism to syphilis may be considered from two points of view. On the one side it is of special interest for us to know in what manner the skin and mucous membranes of a syphilitic person react against different irritants—i. e., the influence of traumatism upon syphilis. On the other side, it is of the utmost importance to ascertain whether latent or active syphilis has a modifying effect upon the healing of wounds, particularly in reference to surgical operations—i. e., the influence of syphilis upon traumatism.

It is a matter of daily observation that the most varied and in no way specific irritants are capable of exciting specific lesions on the skin and the mucous membranes of individuals suffering from constitutional syphilis. Cazenave pointed this out some fifty years ago. Ricord emphasized it especially in his lessons on the chancre. Such observations are, however, often made also as regards other well-known skin diseases. We know that, for instance, psoriasis, lichen planus, and many other dermatoses, have a predilection for such regions as are exposed to mechanical irritation and pressure, and that fresh efflorescences appear on places that had been subjected to some irritation, say the scratching of a pin. In a

similar way we can produce artificially wheals in certain forms of urticaria; new patches of eczema follow different local irritants. Kaposi has expressed it as almost a law governing most skin affections, that the skin reacts against irritants with a sort of specific energy in the sense of the original disease. The study of syphilis offers many occasions for just such observations. Papular eruptions on the palms, the so-called *psoriasis specifica palmaris*, occurs most frequently, and is especially stubborn in persons who perform hard manual labor, or who mechanically irritate their palms in rowing or other gymnastic exercises. Excessive smoking or chewing often causes mucous patches on the lips, the tongue, or fauces. Singers and speakers develop rebellious affections in the throat and larynx. The different normal and pathological secretions and excretions may form the exciting cause for fresh syphilitic eruptions, as the urine, sweat, preputial smegma, gonorrhœal or leucorrhœal discharges. This explains the frequent occurrence of condylomata around the anus and in the genito-crural folds. Many other illustrations of this kind could be furnished. It is only recently that more attention is also paid to the fact that different nonspecific skin disorders may act as irritating factors in the above-mentioned way. One of the oldest observations in this respect was made by Bamberger in 1858. He mentions a transformation of variola pustules into syphilitic ulcers. Finger (Prag. med. Wochenschr., 1881, No. 40) reports the change of furuncles into specific ulcers, and the development of a small papular syphilide out of an eczema. Unna (Monatsh. f. prakt. Derm., 1888) published a very instructive case, where the localization of a syphilitic eruption was determined by a co-existing seborrhœal eczema; and Plumert (Archiv f. Derm. und Syphilis, 1890) adds another illustrative case to this subject.

Cauterisatio Provocatoria.—Especial interest in this question has been aroused by Tarnowsky's monograph, "Syphilis und Reizung" (Viertelj. f. Derm. und Syph., 1877). Starting from the well-established fact that syphilitic manifestations are apt to appear after some traumatism, he made a series of experiments on two hundred syphilitics and fifty patients suffering from other affections, in the hope of finding a true diagnostic criterion for latent syphilis. He cauterized a small area with Ricord's paste (sulphuric acid and powdered charcoal), and found, as a positive result of what he called "cauterisatio provocatoria," a dark-red infiltrated zone, which becomes distinct only after the inflammatory reaction produced by the caustic has vanished. This wall is sharply contoured, hard, three to five millimetres wide, arises gradually, and assumes a brownish color. After twenty to thirty days it slowly begins to disappear. A distinct induration is also noticeable underneath the eschar. When the crust finally falls off there appears in its place a round or serpiginous ulcer, or a few papules, pustules, or tubercles in the surrounding skin.

He emphasizes that such a result may be almost regularly noted in the period of secondary incubation, particularly on patients who had not been subjected to mercurial treatment. In visceral and other forms of tertiary syphilis the result was often negative. Kaposi, Rinecker, and Koebner were unable from their own experiments to verify these statements, while Rieger and Gay fully confirmed them. Although Tarnowsky himself was not able to insist upon the absolute diagnostic value of his cauterization, we may still regard his researches as in many respects interesting and valuable.

In considering the influence of syphilis on traumatic lesions made for surgical purposes, we must not overlook the fact that we live to-day in an era of surgical asepsis and antisepsis and the most vigilant care for the management of wounds, as compared with the utter ignorance of true surgical cleanliness that prevailed before the time of Lister's immortal discoveries. Many statements concerning the disastrous results of operations on syphilitic persons coming to us from those times must therefore at present be taken *cum grano salis*. We still read of an omphalitis following the ligation of the umbilical cord in children suffering from hereditary syphilis, and the transformation of vaccination punctures into syphilitic ulcers, but these occurrences admit of a different explanation. It may be well to point out in this connection that the micro-organism of syphilis—whatever it may be—has *per se* no special tendency to produce suppuration, as is best evidenced in the fact that the chancre, the classical product of syphilis, is hard, and shows rarely any disposition to suppurate. Wherever we see pus in syphilis we have, as a rule, a form of mixed infection. With all due credit to the work of Verneuil, Petit, Duesterhoff, Folinea, and others, who have furnished valuable knowledge as to the influence of traumatism upon syphilis, we can not accept their statements *in toto*, at least not as far as they refer to surgical operations; for it is the united experience of most modern surgeons that traumatic and surgical wounds may heal in syphilitic subjects in the very same manner as in nonsyphilitic ones, as long as the modern recognized principles of wound treatment are strictly adhered to. At the same time we are very well aware of the fact that a severe syphilitic cachexia may interfere with the proper healing of wounds; but here we have to deal not with the specific influence of syphilis as such, but simply with the effect of the general deterioration of the system, which, if due to other nonspecific causes, would work in a similar manner. We also recognize in its full consequences the universally admitted fact that syphilitic lesions, as such, will not stand surgical interference without considerable reaction. The incision into a gumma, into a syphilitic cicatrix, will almost always be followed by ulceration. Neumann (Viertelj. f. Derm. und Syph., 1885, p. 209) has found that, months after the disappearance of syphilitic pap-

ules from the skin, there are still present microscopic remains of cell infiltration around the papillary blood-vessels. We can well understand that a traumatic lesion on such places will easily stimulate these deposits to renewed activity. In this manner we may understand the many failures that are encountered in plastic operations upon syphilitic subjects. But a clean cut on a portion of the skin free from any syphilitic deposit, and in a patient otherwise well nourished, will always heal without any trouble.

SYPHILIS OF THE SKIN.—SYPHILODERMA.

By PRINCE A. MORROW, M. D.

UNDER the general term *syphilides* are comprehended the various alterations in the skin and mucons membranes produced by syphilis. While the syphilitic process may affect every organ and constituent element of the body, its most constant and most characteristic manifestations are determined toward the skin and mucous membranes. The symptomatology of many cases of syphilis, especially of the acquired form, consist chiefly, and in some instances exclusively, of these surface phenomena.

The syphilides are of the utmost importance from a diagnostic point of view, not only in the early stage by furnishing positive evidence, in a visible and palpable form, of the infection of the general system with the syphilitic virus, but their diagnostic significance continues during the entire period of the disease, enabling us to recognize the specific nature of coexistent or succeeding visceral lesions not accessible to ordinary means of investigation. So rarely does syphilis fail to produce lesions of the skin and mucons membranes that their appearance is always looked for as the necessary confirmation of the diagnosis.

In this article only the cutaneous manifestations of the acquired form of syphilis will be considered.

GENERAL SYMPTOMATOLOGY.

The changes in the skin caused by syphilis embrace almost every form of lesion which the structures of this organ are capable of producing—macules, papules, pustules, bullæ, tubercles, and the secondary changes of scaling, crusting, ulceration, and cicatrization are represented in the clinical picture. These eruptive elements are so numerous and varied that there is no single skin disease of constitutional origin which may not be closely imitated. Indeed, it may be affirmed that every form of syphilitic lesion has its prototype among the dermatoses. Hutchinson has formulated it as a general law, that “while syphilis may imitate all known forms of skin disease, it can create no originals.”

The morphological resemblance of specific and nonspecific lesions is not surprising in view of the fact that all alike represent the products of

inflammation and involve precisely the same anatomical structures. In the case of syphilis the inflammatory process is essentially chronic, the slowness of evolution and the duration of its eruptive phenomena distinguishing them from the ordinary exanthemata. While syphilitic simulation is a marked feature of the earlier efflorescences, it is much more strongly expressed in the manifold morbid processes to which the later lesions are subject.

Special Characteristics.—Although syphilitic skin diseases consist of the same eruptive elements as are met with in other forms of cutaneous disease, yet they are impressed with certain peculiarities which reveal more or less distinctly their specific origin and nature. These peculiarities relate to their evolutionary mode, multifarious character, color, configuration, grouping, etc., which will be referred to in detail. While no single feature is absolutely pathognomonic, yet taken together they constitute a clinical picture which is as a rule readily recognizable.

Evolutionary mode. Compared with other inflammatory affections of the skin, syphilitic eruptions develop with remarkable slowness and run a protracted course. They are further characterized by a tendency to develop in successive crops, which are rarely composed objectively of the same eruptive elements. The chronic aphlegmasiac character of the syphilitic process permitting the development of new crops of eruptions before the involution of the old ones, the transformation or gradual passage of one form into another, the modifications which the same lesion undergoes in the various stages of its development and decline, give to the syphilitic eruption a distinctive physiognomy which is expressed by the term

Polymorphism. The multiplicity of eruptive forms present at the same time constitutes one of the most constant and characteristic features of the syphilitic eruption. In no nonspecific disease of the skin is this peculiarity developed to the same extent and with the same frequency. Macules, papules, scaling patches, and pustules may be found side by side or on different parts of the body, and this association or coexistence of elementary lesions of dissimilar forms is the rule in syphilis rather than the exception.

The symmetry of the syphilitic cutaneous manifestations is a very characteristic feature during its earlier stages, the lesions on one side of the body forming an exact counterpart of those on the other. This tendency to symmetrical disposition, which is equally well marked in the exanthemata, and therefore of no especial value as a differential feature, becomes less marked as the disease advances in its evolution. The lesions of the tertiary stage, although frequently found on both sides, are rarely symmetrical.

The configuration and grouping of the syphilides are distinctive. The

points of efflorescence manifest a tendency to develop in curved lines, forming circles, arcs, or segments of circles, which is especially seen in the papular syphilide. This peculiar grouping is determined, no doubt, by the anatomical arrangement of the cutaneous capillaries. The tendency to assume an annular form is also manifest in individual lesions of the large papular type and tubercular lesions which advance at the periphery while receding in the center. The crescentic, serpiginous, and horse-shoe shapes of the ulcerative lesions constitute a characteristic feature.

Location. The syphilides, like the exanthemata accompanying the eruptive fevers, may be distributed over the whole surface of the body, yet each form of the eruption shows a predilection for certain localities.

The erythematous syphilide is usually found upon the chest, trunk, and flexor surfaces, rarely upon exposed parts; the papular syphilide upon the face, brow, margin of the hairy scalp, back of neck, trunk, and limbs; the squamous variety upon the palmar and plantar surfaces, where there is an absence of sebaceous follicles. The pustular syphilides of the acneform and impetiginous varieties exhibit a preference for the scalp and hairy parts of the face, and other regions of the body where the sebaceous and hair follicles are abundant; the ecthymatous and rupial syphilides affect principally the lower limbs; tubercular lesions are found everywhere. Moist papules choose for their location the natural orifices, the commissure of the lips, the entrance to the nares, the genital and anal folds, etc., wherever the skin is fine and delicate and exposed to moisture and friction. On the other hand, certain regions of the body enjoy a remarkable freedom from the eruptive disturbances due to syphilitic infection. Perhaps the most favored localities in this respect are the dorsal surfaces of the hands, wrists, and feet, and the clavicular and sternal regions, which are singularly exempt from the early eruptions; but this immunity does not extend to the late destructive lesions, which are frequently found in the clavicular region.

The color of the syphilitic eruption has always been regarded as a valuable diagnostic feature. It has been variously described as yellowish-red or dirty brown, and has been compared with the color of raw ham, copper, etc.; it differs with the age of the lesion, the texture of the skin, the complexion of the individual, and other circumstances. In the more acute stage the eruption often presents a clear pink or bright red color, which fades to a brownish-red or coppery tint. In dependent portions of the body, as in the lower extremities, the efflorescence may take on a bluish-red or purplish tint, due to stasis and the transudation of the coloring matter of the blood. As the eruption gradually disappears, it becomes greenish-yellow or grayish, exhibiting the changes in pigmentation that characterize superficial ecchymoses. In the later lesions the characteristic coppery hue of the syphilides is not so pronounced. In the blonde,

the syphilitic tint is brighter; in the brunette, the brownish tint predominates; in the cachectic, the color is apt to be livid or bluish-red.

The pigmentation of the skin left by syphilitic lesions is due to the escape of the normal coloring matter of the blood into the Malpighian layer and its subsequent metamorphosis. The same result may follow long-continued congestion of the skin from various morbid conditions, although the purplish-brown, almost black, pigment stains left by syphilitic ulcerations are characteristic, and possess a certain diagnostic value.

The scales of syphilitic lesions differ from those of nonspecific eruptions. They are thinner, more superficial, less abundant, and less adherent than in cutaneous diseases characterized by analogous formations. Their color is usually of a dirty grayish-white, and they lack the glistening, silvery-white appearance of the scales of psoriasis, for example.

The crusts of the pustular and ulcerative varieties of specific lesions are grayish, greenish, brownish, or black in color, and exhibit certain peculiarities in their construction. They are made up of superimposed layers; their surfaces are rough and laminated; they are easily detached, and are thicker than the crusts of corresponding nonspecific lesions. The crusts of ecthymatous lesions are often surrounded by an ulcerative ring, and seem to swim upon the purulent font beneath. The conical stratified crusts of rupia, which constantly absorb pus from the suppuration that goes on beneath them, attain large dimensions, and are not met with in any other disease.

Ulcerations. The syphilitic ulcerations assume a reniform or horse-shoe shape, which is very characteristic. This is due to the fact that the healing of the ulcer takes place in the center, or along the concave margin, while the ulcerative process advances at the convex border. The margins of the syphilitic ulcer are usually well defined, its edges perpendicular, its floor grayish or pseudo-membranous, secreting a sanious pus often mixed with blood, and surrounded by a reddish areola, which turns to a dark brown.

The *cicatrices* of syphilis are also characteristic in color, contour, and other objective appearances. They are at first pigmented; later the brownish or violaceous coloration gradually disappears, leaving a clear white tint. The cicatricial membrane may be uniformly smooth or somewhat reticulated. They are surrounded by a dark pigmented areola, which is exceedingly persistent.

The cicatrices following syphilitic ulcerations are often of importance from a diagnostic point of view, their form and disposition revealing the extent, depth, and course of the ulcerative process which has swept over the surface.

The absence of pain and itching. The absence of these subjective symptoms in the cutaneous manifestations of syphilis is a distinctive

feature, and constitutes a valuable differential sign; the patient is often unconscious of the existence of an eruption until it is brought to his attention by the physician. The absence of pruritus is probably due to the slow, indolent character of the specific process. This negative characteristic, however, does not always obtain. In certain syphilides marked by a precocious, rapid development, especially those of the pustular and nodular varieties about the scalp and head, and the mucous patches about the genitals, the pruritus is frequently quite pronounced. Syphilitic lesions that are exposed to constant friction and irritation, as at the angles of the mouth, between the toes and about the anus, etc., are sometimes exceedingly painful.

It has been observed that, when syphilis has developed in persons of an eczematous diathesis, the eruptions may be extremely pruriginous.

Regular Evolution.—In the ordinary evolution of syphilis the cutaneous manifestations develop with a certain order or regularity not absolutely constant, but with sufficient uniformity to admit of their division into two more or less distinct classes, designated as secondary and tertiary accidents. In its methodic evolution syphilis presents many points of resemblance with the eruptive fevers, in which a classic period of incubation is succeeded by an eruption of definite anatomical form. In the case of syphilis an incubation period of six or seven weeks intervenes between the appearance of the chancre and the outbreak of the eruptive phenomena. This period may be somewhat abridged, or it may be materially lengthened. Exceptionally it may be prolonged to three, four, or five months, or even longer.

The *secondary* eruptions are generalized, superficially seated, with a tendency to spontaneous disappearance. They are not continuously present, but come out at variable intervals in successive crops, periods of activity alternating with periods of repose, in which no manifestations are observed. Fournier has very properly characterized a syphilis of ordinary severity “as a condition of apparent health, interrupted from time to time by morbid invasions of limited duration.”

In the normal evolution of syphilis, if it may be so termed, there is not only a chronological regularity in the appearance of the accidents, but there is also a definite order in the development of the different eruptive forms. The syphilitic process ordinarily affects the skin by the successive implication of one layer after another, with a gradual and progressive extension from the superficial to the deeper structures. According to this pathological programme, macular, papular, and pustular eruptions develop in a certain order of succession, enabling us to draw a distinction between recent and remote eruptions from the tissues involved. There is thus a correspondence between the anatomical characters of the lesion and the date of its development, and one may determine with

approximative certainty the age of the syphilis from the objective characters of the eruptive elements. The stage of secondary manifestations is always of limited duration; after a certain period they cease to appear. This cessation of activity may be permanent, marking the definite end of the disease, or it may, after a more or less prolonged period of latency, be succeeded by tertiary accidents.

The cutaneous manifestations of *tertiary* syphilis are characterized by special features sufficiently typical to constitute a separate group; they are ranged without symmetry, localized and deep-seated. In the evolution of these accidents all resemblance to the eruptive fevers ceases, there is no order or sequence in their development. They present the widest variations in number, morbid activity, and the intervals which separate their outbursts. There is practically no limit to the duration of this stage. After years of repose and inactivity the disease may suddenly reveal itself by lesions of a profoundly destructive character.

Parallel between Secondary and Tertiary Accidents.—The more strongly marked and distinctive characteristics of secondary and tertiary eruptions may be thus formulated:

Secondary manifestations almost always follow the primary lesion; without their occurrence syphilis can not positively be said to exist.* Tertiary manifestations are not inevitable; they occur only in a certain proportion of cases.

Secondary eruptions are generalized, symmetrical in development, superficial in character, with a tendency to spontaneous involution. Tertiary eruptions are limited and localized, asymmetrical, deep-seated, with a destructive tendency, producing more or less loss of tissue, and leaving permanent cicatrices.

Secondary manifestations appear promptly after a classic period of incubation, and in a certain order of succession—erythematous, papular, pustular, etc.; they are limited in duration, and after a certain period they cease to develop. Tertiary manifestations develop without order or regularity, it may be immediately after the chronological completion of the secondary stage, or it may be months or years later; their tendency is to persist and spread locally; they may continue to recur during the lifetime of the individual.

Secondary eruptions yield with remarkable facility to the curative influence of mercury, while tertiary symptoms prove refractory to its use. The action of iodide of potassium in arresting tertiary processes is marked, while it has but little influence over secondary symptoms.

* In those exceedingly rare cases reported where syphilis has apparently revealed itself for the first time—years after the chancre—by lesions of a tertiary order, it is not probable that the secondary stage was entirely skipped, but rather that its manifestations were so slight as to pass unperceived by the patient.

The secondary lesions contain the poison of syphilis; they are inoculable and contagious. Tertiary lesions are nonvirulent; they are not endowed with contagious activity.

In tracing this outline of the classic course of syphilis and drawing a parallel between its secondary and tertiary accidents, it is to be understood that such generalization applies only to typical cases. Syphilis does not always pursue this methodic evolution with an orderly procession of its phenomena and a regular gradation of its forms. The topochronological classification of the lesions of syphilis is to a certain extent artificial, and lacking in scientific accuracy. There is no absolute and invariable concordance between the anatomical form of the lesion and the date of its development. There may be an overlapping of the stages, entirely obliterating the lines of demarcation between them. Secondary eruptions may continue to recur after the chronological completion of this stage, while lesions of a distinctly tertiary type may develop in the first few months. There may be a transmutation of anatomical forms; the papule which represents the type of the secondary lesions may be merged by almost insensible gradations into the tubercle which constitutes the type of tertiary lesions.

Variations in Type.—Even in cases where syphilis pursues a more or less regular development we find a great variation in the type of the disease, viewed from the standpoint of its surface accidents. These variations relate to the intensity of the eruptive phenomena, their multiplicity and succession, their morbid activity and duration.

Intensity.—There is ordinarily a certain correspondence between the character of the cutaneous accidents and the severity of the disease. Many cases of syphilis are mild throughout their whole course, and this essential benignity is expressed in the cutaneous exanthem, which impresses the skin so lightly as to leave no trace. The entire manifestations may be confined to a macular efflorescence, or a few scattered papules which disappear definitively in the course of a few weeks, and the patient afterward shows no symptoms.

Multiplicity and Succession.—In certain cases the eruption is not only generalized and universal, but there is an almost constant succession of outbreaks; before one group has undergone involution another is in process of development, so that in one form or another the eruption is almost continuously present.

A great diversity is likewise observed in the *character of the morbid process*. In some cases the lesions are dry and atrophic throughout, even the dense, voluminous tertiary deposits undergoing resolution through a degenerative resorption of the cellular infiltration. In other cases the lesions are moist, with a marked tendency to suppuration. The ulcerative process not infrequently takes on the characters of phagedena. In

certain cases the tendency to local spreading is a marked feature, the ulcerative process assuming a serpiginous form and creeping over large surfaces.

Duration.—While the earlier accidents of syphilis are essentially resolute, with a tendency to disappear spontaneously or under the influence of treatment, yet in certain cases the lesions are impressed with a character of chronicity and obstinacy to treatment which is entirely foreign to the nature of the disease. These features are especially observed in certain scaly syphilides of the palms and soles, in leucoderma, as well as in certain superficial glossopathies which persist long beyond the natural life-term of such accidents.

Unusual Modes of Evolution.—Under the general category of *irregular syphilis* may be included different types of the disease determined by anomalous modes of evolution. Deviation from the typical evolution of syphilis impresses certain peculiarities upon the eruptive phenomena and introduces an element of confusion in all attempts to classify them. In these anomalous cases the harmony ordinarily observed between the form of the lesion and the date of its appearance is destroyed, and there is instead an intermingling or blending of secondary and tertiary accidents, developed without order or regular sequence.

The irregular development or coexistence of superficial and deep eruptive accidents may be seen in the following conditions:

Benign Rapid Syphilis.—In this class of cases the succession of the eruptive phenomena is so rapid that tubercles and gummata make their appearance before the complete involution of the papular or pustular eruptions, or there may be a simultaneous development of secondary and tertiary forms. The lesions are, however, essentially benign throughout the entire course of the disease.

Malignant Precocious Syphilis.—In cases of this type there is not only a precocious development of tertiary lesions, but they are characterized by a special gravity. Superficial accidents, if they occur at all, rapidly give way to pustulo-ulcerous or gummatous lesions. The syphilitic process seems to skip over the superficial structures and attack at once the deep tissues. Independent of the precocity of the process, the elements of malignity are found in the violence of the irruption, the multiplicity of the lesions, their ulcerative and rapidly destructive character, and their frequently grave systemic complications.

Retrogressive Syphilis.—In this category are to be placed a class of cases in which there is a reversal of the topo-chronological order of specific manifestations—in which lesions of a distinctly tertiary character are succeeded by superficial forms of accidents. Thus, for example, a resolute papular eruption may follow a pustulo-ulcerous syphilide which has left indelible traces.

Cases of this character are so exceedingly rare that they are only mentioned for the sake of completeness. Their occurrence is in direct contravention of a well-established law of syphilitic evolution, viz., that when deep destructive lesions once develop, either in regular order or precociously, they continue thereafter to dominate the pathological field; the syphilitic process does not retrocede and again attack the superficial structures.

Second Infection.—Finally, may be mentioned the very rare but nevertheless well-authenticated cases of syphilitic reinfection, in which the patient may exhibit the characteristic lesions of a second attack while he bears upon his person the stigmata or, it may be, the active manifestations of a former attack.

In some of these cases the first attack produces peculiar modifications in the general character and course of the second one; in other cases, however, the course of the disease conforms in all respects to its classic mode of evolution in a virgin case.

Etiological Considerations.—The cause of the immense diversity in the cutaneous expressions of syphilis must be sought for not in the quality or the source of the syphilitic virus, but in the character of the soil in which it is implanted. While we recognize that the presence of the syphilitic virus in the economy is the efficient cause of its eruptive phenomena, we must also recognize that behind and beneath this essential etiological factor there are certain causes inherent in the organism which markedly modify their general characters and course.

Constitutional Peculiarities.—The more we study syphilis the more we are impressed with the fact that the type or quality of the disease is largely the product of peculiarities of individual constitution. These peculiarities may be quite independent of physical endowments which have a relation to the general health of the individual. While syphilis is usually more severe in the cachectic, the weak, and the debilitated, yet severe eruptive disturbances may occur in robust persons who are otherwise in vigorous health. On the other hand, delicate persons often suffer lightly from syphilis.

The most important factor in determining the character of the cutaneous manifestations of syphilis is the *idiosyncrasy* of the patient; no other explanation of the manifold and marked differences in the eruptions which attend syphilis can be given. The essential nature of this etiological factor can not be defined. As far as we can apprehend its causal relation to the cutaneous phenomena of syphilis, it would seem to consist in a greater or less susceptibility of the cutaneous tissues to the irritant action of the syphilitic virus, and in certain localizing influences due to inherent peculiarities of structure, which determine the type of the morbid process.

Independent of this individual predisposition there are also numerous accidental conditions of a general or local nature, and various pathological circumstances which influence the mode of syphilitic evolution. These occasional causes may favor the appearance of the cutaneous phenomena, multiply or aggravate them, determine their localization in certain regions, hasten their disappearance, and in other ways derange their normal evolution.

Climate.—The extensive geographical distribution of syphilis has afforded an abundant opportunity of studying the influence of climatic conditions. In general it may be said that syphilis is more apt to be of medium intensity in temperate regions, and that the cutaneous manifestations are severer in hot climates. The aggravating influence of climate is relative rather than absolute; it would seem to depend upon conditions of adaptation of the individual. It has been observed that while syphilis is not ordinarily more severe in the natives of hot countries, it is apt to display features of malignity in foreigners who have not been acclimated. The influence of cold and humidity upon the intensity and duration of syphilitic eruptions is well attested. It has been observed that syphilitics whose industrial occupations expose them to these unfavorable conditions are apt to have aggravated and persistent eruptions which are exceedingly obstinate to treatment.

Age and sex seem in no way to exert a decisive influence upon the general characters of the syphilides. While syphilis is more apt to be severe in the extremes of life, when the capacity of resistance is the least, yet this increased severity is reflected rather upon the nervous and nutritive systems than upon the cutaneous surface. It has been observed that in women and children the cutaneous accidents are more apt to be localized around the natural orifices, and there is a greater tendency to transformation into mucous patches, which may be explained by the greater fineness and delicacy of the skin.

The influence of physiological crises is more or less marked. The manifestations of hereditary syphilis, even when the diathesis has been long dormant, are apt to reappear during the periods of second dentition and of puberty. The influence of pregnancy, lactation, and the menopause in exciting, aggravating, and prolonging the duration of syphilitic accidents is a matter of common observation.

Alcoholism.—Observation shows that syphilis is more severe in the intemperate. The stimulating effect of alcohol upon the nervous and cutaneous vascular systems explains its undoubted influence in determining successive or more or less continuous crops of accidents. A prolonged debauch will provoke the appearance of an eruption in a long-latent diathesis.

In connection with the pathogenetic influence of cutaneous excitation,

ab ingestis, may be instanced the internal use of *sulphur waters*. It is well established that sulphur waters have a marked influence in provoking an outbreak of new crops, or of aggravating an existing eruption in syphilitics. The *action revelatrice* of sulphur waters has been long and extensively utilized by physicians and patients as a touchstone of the activity of the diathesis.

Certain *drugs* which exercise an irritant action upon the cutaneous vascular system influence the outbreak of syphilitic phenomena.

Diathesis.—The marked influence of certain diathetic conditions upon the general characters and course of the syphilides is worthy of consideration. There is no necessary incompatibility between syphilitic skin diseases and other eruptions of a nonspecific nature. Syphilis does not so completely dominate the pathological field as to exclude other maladies. It is a matter of common observation that syphilis is not only more severe in eczematous, scrofulous, and lymphatic subjects, but that it manifests the same topographical affinities and imitates the general characters of the diathetic disorder.

The predisposition to eruptive disorder constituted by the *eczematous diathesis* not only hastens the explosion of accidents, but aggravates and prolongs them. In such individuals syphilis has a tendency to localize itself upon points which are seats of predilection for eczema, and such lesions not infrequently undergo what has been termed a dartsous metamorphosis. As examples, may be mentioned syphilides of the palms and soles, which take on the objective characters of eczema and prove exceedingly rebellious to specific treatment.

The reactionary effect of *seborrhœa* upon syphilis is well known. Unna has called attention to the fact that syphilis developing in a seborrhœic individual exhibits in form, localization, grouping, and scaling so many features of resemblance to seborrhœa that it can be explained only on the assumption of a pathological relation which he terms an "interlocking" of the two processes, giving to the syphilis a seborrhœic physiognomy. According to him, "the flat, inflammatory, reddish-yellow seborrhœic plaques become transformed into pigmented, more elevated, hard, specific papules, varying in coloration from that of flesh to that of copper, in infiltrations papular at the borders, circinate, raised, which betray their origin by their thick, easily detached crusts and the yellowish tint of the neighboring parts. Upon the hairy scalp, the beard, and the pubes these incrustated papules unite here and there, forming prominent plaques, depressed at the center, and surrounded by perpendicular, polycyclic borders. . . . Syphilis follows the lines of the gross sudoriparous glands, inflamed and affected with seborrhœa in the naso-labial furrow. This condition is so typical that it is easy to recognize at a glance, when one has to do with a seborrhœo-syphilitic affection."

The coincidence of the *scrofulous diathesis* determines marked modifications in the character of syphilitic manifestations—in their form, localization, and processes. Syphilitic lesions in such subjects are apt to be moist, with a marked tendency to suppuration and ulceration. The objective identity of the scrofulodermata and the syphilodermata has indeed suggested a combination or symbiosis of the two morbid processes, constituting what has been termed serofulo-syphilis. It is exceedingly difficult to differentiate between them and assign to each diathetic disorder the precise measure of its pathogenetic influence.

Intercurrent Maladies.—Any intercurrent inflammatory process in the course of syphilis may, by creating a flexion to the surface, determine an explosion of cutaneous accidents. An intermittent or other acute febrile attack may materially shorten the duration of the secondary incubation and precipitate the appearance of the syphilitic exanthem. Mauriac reports a case in which an attack of rubeola abridged the duration of this period to twenty-seven days, when constitutional accidents appeared. Such pathological coincidences frequently affect the form and localization of the eruption, and may hasten its involution. Unna states that “a miliaria rubra may bring about the outbreak of a small papular syphiloderm; an attack of scabies may cause a preference for the interdigital folds and gluteal prominences as places of predilection for the exanthem.”

As is well known, an attack of variola may cause the rapid involution of a specific exanthem; but it is to be noted that not infrequently the pustules of variola become gradually transformed into mucous patches, tubercles, or other characteristic specific lesions.

An attack of typhoid fever, pneumonia, pleurisy, etc., may cause the rapid involution of existing specific accidents. This curative effect is, however, of transitory duration; the cutaneous manifestations are destined to reappear in full force when the repressive influence of the febrile access is removed. I have observed a papulo-squamous syphilide of extensive distribution rapidly melt away during an attack of double pneumonia only to reappear when the stage of convalescence was fully established. That an attack of erysipelas exerts a salutary influence upon various lesions of the skin is a rule to which syphilitic manifestations form no exception. Its effect is not limited to the surfaces invaded by the erysipelas, but is manifest in regions remote from the local inflammatory focus. The curative action of erysipelas, as of other infectious fevers, is not durable; it constitutes only a temporary interruption in the course of the disease.

Local Causes.—The principle that a latent syphilis may be called into activity by an external irritant is well known, and its application has been utilized as a test in the *cauterisatio provocatoria*. Traumatisms, vesicatories, or other cutaneous irritants not infrequently provoke a syphilitic

eruption upon and about the seat of the irritation, or intensify the characters of an existing eruption. The localizing effect of vaccination in determining a papular efflorescence which is massed about the vaccine vesicle has been often observed. Wounds upon syphilitic persons may assume the characters of syphilitic ulcers. It is not uncommon to observe that the local congestions in the lower extremities caused by varicose veins may determine the production of ulcers in syphilitics which manifest an utter insensibility to specific treatment. In these cases no doubt the stagnant circulation creates a *locus minoris resistentiæ*, rendering the tissues more vulnerable to syphilitic action.

The series of *secondary changes* which syphilitic lesions undergo—the greater or less abundance of the secretion, the character of the scales, crusts, ulceration, and resulting cicatrices—while determined largely by the nature of the syphilitic process, are modified in a marked degree by conditions relating to the individual. The atypical forms assumed by syphilitic lesions from peculiar modes of extension are doubtless due to certain local inflammatory and septic processes which are more or less accidental. These modifications mask the specific physiognomy, and create the most deceptive resemblances to other skin diseases which have already been referred to as *syphilitic imitation*.

As examples of the influence of *structural peculiarities of the individual*, may be mentioned the tendency to abundant and excessive proliferation of the epidermal elements which imparts to many cases of syphilis the aspect of psoriasis. This resemblance is marked, not only in the generalized papulo-squamous syphilide, but also in the later scaly syphilides which are localized upon the palms and soles.

The tubercular syphilide often closely imitates the lupoid process. This is especially seen upon the face when the concentric tubercular rings enlarge at the periphery and heal in the center, or again when it assumes a serpiginous mode of extension. In other cases there is a pronounced tendency to hypertrophy of the papillæ, the papillary prominences resembling those of lupus papillaris or verrucosus. In certain cases the vegetations may resemble those of framboesia. The ulcerations which follow tuberculo-gumous lesions may simulate, in their objective characters and extension, rodent ulcer, epithelioma, etc.

The complications in the course of specific lesions from inflammatory processes, which may be simple, gangrenous, or phagedenic, determine deviations from the type form and singularly diversify the clinical picture of syphilis.

The importance of the rôle which *pyogenous microbes* play in the production of the pustular and ulcerative lesions of syphilis can not, in the present state of our knowledge, be clearly defined. Many modern writers are disposed to regard all lesions in which the purulent element is

accentuated as local infections due to the accidental access of the microbes of common inflammation. According to this view, eethyma, rupia, ser-piginous ulcerations, etc., are not specific products, but secondary infections ingrafted upon syphilitic neoplasms.

Certainly we find that lesions of a pustular or ulcerative character are much more common in persons whose hygienic surroundings are bad, and who have been exposed to the microbe-breeding conditions of dirt and uncleanness, and other favoring opportunities which would render such infection probable. On the other hand, the fact must not be lost sight of that in certain individuals all irritative lesions of the skin exhibit a marked tendency to the production of pus. This pyogenic proclivity may be an individual peculiarity, and entirely independent of external conditions which favor microbe infection. As regards the ser-piginous forms of ulceration commonly met with in the later stages of syphilis, it is probable that they are the product of a mixed infection, the primary pathogenetic agent being the syphilitic virus, while the pyogenous process is engendered secondarily by the staphylococci of suppuration. New studies in microbiology are necessary before we can determine, positively, the predominance of the syphilitic or the pyogenic element in the production of these anomalous forms which do not follow the normal plan of syphilitic evolution.

It would appear, therefore, that it is not the number and variety of the elementary lesions which give to this disease its protean physiognomy; it is rather the ulterior changes which these lesions undergo that make up the wonderful and bewildering diversity of syphilis. The peculiar types assumed by the morbid process partake more or less of the characters of accidental phenomena; they are not the direct expression of the syphilitic virus, but rather incidental effects resulting from the reactive forces of the organism; they belong to the individual rather than to the disease.

Causes of Tertiariism.—By many modern authorities what has been termed "tertiarism" is not regarded as the exclusive product of the syphilitic virus, but due to a complex of co-operative causes. This opinion is based upon the comparative infrequency of tertiary manifestations and their nonvirulence. The study of the natural history of syphilis shows that tertiary accidents are not inevitable; they occur in but a small proportion of all cases, while inoculation experiments as well as clinical observations have demonstrated the absence of the virulent principle from the blood as well as the lesion of syphilis which has passed into the tertiary stage.

As regards the *frequency* of tertiary accidents, the character of the treatment, the constitutional peculiarities of the patient, and other conditions, exert a modifying influence. Manriac, who has made an exhaustive study of this subject, basing his conclusions upon the analysis of ex-

tensive statistics, puts the proportion of cases that pass into the tertiary stage at from five to fifteen per cent. Hiaslund, in a communication to the "Tenth International Congress of Medical Sciences," presented statistics of the Communal Hospital of Copenhagen for eight years, embracing 5,636 cases of syphilis, of whom 616, or 10.9 per cent, were affected with tertiary syphilis. Neumann, in a paper read before the "Second Congress of Dermatology and Syphilography," gave an analysis of 9,742 cases of syphilis treated at his clinic; of these, 665, or 6.82 per cent, were cases of tertiary syphilis. As more particularly bearing upon this inquiry, it is to be noted that in less than one half of these cases were the lesions located in the skin. While by most syphilographers cutaneous lesions are considered the most common and habitual expression of tertiary syphilis, Fournier's personal statistics of 3,429 cases of tertiary syphilis embraced only 787 cases of cutaneous syphilides.

The *nonvirulence* of late tertiary products has been generally recognized as a law of syphilis, the exceptions to which are so few that they do not invalidate the rule. At what precise period in its evolution the syphilitic diathesis undergoes that radical transformation which extinguishes its virulent principle can not be definitely stated. The contagiousity of tertiary lesions developed precociously, in cases where there is a precipitation of syphilitic evolution, is still undetermined, as data of definite value are lacking upon which to base a positive opinion.

These facts, taken in connection with the clinical behavior of tertiary syphilis has led many modern syphilographers to class all late accidents as *post- or parasyphilitic manifestations*. Various theories have been advanced as to their pathogenesis; their tendency to localize themselves in certain places, or recur upon the site of previous eruptions, has led to the doctrine that tertiary syphilis is a disease of the tissues rather than of the blood. According to this theory, tertiary manifestations are purely local processes depending upon pathological modifications of the tissues in the secondary stage.

Neumann believes that tertiary syphilis represents isolated foci, which are the *reliquats* of exudates proceeding from the secondary period, and that in addition there are chemical alterations in the tissues which ought to be referred to a specific process, to the secretions produced by the bacteria.

The important pathogenic rôle of the toxins or waste products of the bacilli in the production of tertiary accidents, although it rests upon hypothesis and can not in the present state of our knowledge be clearly defined, is nevertheless generally conceded.

Whatever differences of opinion there may be as to the immediate and efficient cause of tertiarism in syphilis, all observers agree that there are certain accessory or contributing causes which exert a marked influence in

predisposing to these accidents. Prominent among these etiological factors are the absence or insufficiency of treatment, the coincidence of certain pathological states, as scrofula, tuberculosis, malaria, alcoholism, privation, misery, etc.; in fact, all those conditions which are recognized as factors of gravity in syphilis tend to perpetuate the disease in the form of tertiary manifestations.

While the lack of treatment and the pathological predispositions constituted by the conditions just enumerated undoubtedly play a prominent rôle in the production of tertiarism, yet in a large proportion of cases they may be eliminated from consideration. Long-continued observation shows conclusively that the most active and prolonged treatment does not afford an absolute guarantee against the occurrence of tertiary accidents; on the other hand, many syphilitics who have never taken a grain of mercury or iodide of potassium entirely escape them. Likewise, persons in the most flourishing health, entirely free from any diathetic predisposition, and exposed to no unfavorable hygienic conditions, may develop a severe type of tertiary syphilis, while the subjects of the most profound cachexias may never pass into the tertiary stage. These clinical facts force us to recognize that the most powerful predisposing cause of tertiarism must be sought for in physiological peculiarities of individual constitution. This physiological predisposition is expressed in a peculiarity of the organic substance, by virtue of which there is a greater aptitude to conceive the action of the syphilitic poison and to develop and perpetuate its morbid processes almost indefinitely. In cases where it does not exist the normal reactionary forces of the organism, aided by treatment, are sufficient to dominate the disease and limit its manifestations to the secondary stage.

Since the definite peculiarities of organization which constitute individual predisposition are revealed by no outward sign, they escape recognition and can not be utilized for prognostic purposes. Any opinion as to the eventuality of tertiary accidents must therefore in ordinary cases be based largely upon a calculation of probabilities. As Mauriac states: "*C'est une affaire de chance* ; it is probable that such or such a patient will escape tertiarism because it is relatively infrequent in proportion to the aggregate of cases of syphilis that turn out well."

General Morbid Anatomy.—It will simplify our conception of syphilis to recognize that its numerous lesions, no matter how diverse they may appear, all possess essentially the same histological characters, and owe their origin to the same pathological process. Microscopical investigation shows that every form of syphilitic lesion, from the earliest and most superficial to the latest and most profound, consist of an infiltration of round or embryonic cells in the connective tissues of the different organs. These embryonic cells constitute the essential

element of every syphilitic lesion. Even in the erythematous eruption which expresses the lightest and most transitory touch of syphilis there is, in addition to the hyperæmia, a slight cell infiltration permeating and surrounding the walls of the blood-vessels of the papillæ and corium. In the syphilitic papule, which represents the type and generating element of all other lesions, the process affects primarily the papillary body; later, by an extension of the process to the deeper parts of the derma and the subcutaneous tissues, the tubercle or gumma is evolved. Accordingly, then, as the cellular proliferation affects this or that constituent element of the skin, we have differences in the situation, volume, density, and conformation of the lesions, but they are all united by the lines of histological identity.

It is a pathological law which admits of no exception, that these infiltrated cells never become organized into connective tissue, but undergo involution through absorption, or disappear by a process of suppuration.

A special feature of syphilitic infiltration is its tendency to increase by peripheral extension, so that the borders always represent the most recent cell accumulation. This centrifugal tendency is equally marked in the retrogressive process which invariably begins in the center or oldest part of the infiltration. The three fundamental characters of all syphilitic lesions—infiltration, nonviability, and centrifugal course—have been clearly formulated by Jullien as follows:

“I. *Infiltration of the derma and of the mucous layer of the epidermis with small cells.* These cells, which closely resemble the aspect of the embryonic elements encountered in fleshy granulations, are heaped up at the periphery of the vessels, between the trabeculæ of the corium, and finally involve the papillæ and Malpighian body to such a degree that the limitation between these two layers of the skin entirely disappears.

“II. *The inevitable destruction of those cells which are incapable of organization.* At the end of a certain time the infiltrate undergoes a fatty degeneration and enters in the organism by resorption or ends in a purulent dissolution. In any case the vitality of the secondary syphiloma is not sufficient to transform it into definite tissue. After its disappearance the elements of the tissues in the midst of which it was established again take on their normal disposition without any necessary loss of substance.

“III. *The centrifugal course of the neoplasm, both in its development and in its retrogression.* It is always from the center to the periphery that the infiltration takes place; the borders of the lesion are consequently more recent than the center; hence the differences in aspect which may be presented in the two parts. When the center becomes depressed under the influence of retrogression, the neoplasm may attain

its maximum of development at the borders ; such is the reason of certain forms—cup-shaped, annular, etc.”

The clinical signs presented by the papule in its evolution, and the ulterior alterations which it undergoes, admit, therefore, of an easy interpretation. “The papule is prominent because there is a cellular infiltration ; hard, because this infiltration is dense ; it is brilliant, because the epidermis is tense over the summit ; surrounded by a collarette, because the horny layer breaks under the effect of this tension ; it is red, because the coloring matter of the blood furnishes an extravasation ; and, finally, when resorption takes place, the epidermis wrinkles at its surface and is eliminated by an ephemeral desquamation.”

Modifications of the papular type occur from the punctiform or more diffuse character of the cell infiltration, its localization in or about the follicular structures, etc. A slight increase in the intensity of the process produces an exudation of serum, which raises the epidermis, resulting in a vesico-papule or a papulo-pustule. Exceptionally the entire exudate may become purulent, presenting the characters of a frank pustule.

The tubercle, which may be regarded as an exaggerated papule differentiated by its deeper infiltration, its denser consistence and more globular form, and the gumma represented by a mass of embryonic cells in the subcutaneous tissue forming a nodule, both increase gradually at the periphery, while the central cells undergo necrobiotic changes. All the different phases exhibited by both tubercle and gumma in their development and decline may be referred to peripheral hyperplasia and central mortification.

Diagnosis.—The elements of diagnosis are based chiefly upon the semeiological characters which have already been traced—polymorphism, symmetry, color, configuration and grouping, location, absence of subjective sensations, etc. These undoubtedly constitute valuable diagnostic signs, which enable one oftentimes to pronounce at the first glance and without hesitation upon their specific nature. Nevertheless, it is well to bear in mind that the specificity of syphilitic lesions does not rest solely upon their morphological characters. There is no single characteristic attributed to syphilitic skin diseases which belongs exclusively to them ; each and every feature may be manifest in the idiopathic affections of the skin. Many forms of dermatitis, such, for example, as eczema and scabies, are characterized by polymorphism and symmetrical development ; the annular configuration is quite as marked in psoriasis ; the grouped disposition is seen in lichen scrofulosus and lichen ruber. Coppery coloration is not confined to syphilis ; many dermatoses manifest the same topographical affinities around the natural orifices and other places of predilection of syphilis.

While there is no single objective phenomenon of syphilis absolutely

pathognomonic, yet there are certain peculiarities in the combination, grouping, and mode of evolution of syphilitic skin diseases which impress upon them the "specific" seal. These more minute peculiarities, which serve as a basis of differentiation, will be referred to in detail in connection with the description of the different eruptive forms.

The history of the primary sore, which may, however, be fallacious from its possible confusion with chancre, or defective, particularly in the case of women, is valuable as presumptive evidence. Of much more value is the general history of constitutional syphilis, and especially the coincidences of lesions manifestly syphilitic upon the mucous membranes or in other organs. This corroborative evidence may be decisive in determining the diagnosis of cutaneous lesions otherwise obscure and equivocal.

Independent of their objective characters, the most precious resource in the diagnosis of the syphilodermata is specific treatment. While resolution is the habitual termination of secondary accidents, yet mercury abates their intensity, and causes a much more speedy disappearance than would have taken place in the natural course of the disease. It is, however, in lesions of the tertiary type that the diagnostic value of test treatment is most signally shown. Many of the late accidents which simulate lupoid, epitheliomatous, and other nonspecific lesions so accurately as to defy differentiation from their objective characters alone, rapidly clear up under the influence of iodide of potassium.

Prognosis.—We have seen that the secondary lesions are essentially resolvable; they are limited in duration, and often disappear spontaneously. While the later lesions do not manifest this tendency to spontaneous resorption, their marked susceptibility to the curative action of specific treatment almost invariably insures their prompt disappearance. Viewed in the aspect of local lesions, the prognosis of the syphilodermata is, therefore, almost always favorable.

The most important question in this connection is the prognostic significance of the eruption upon the general character and course of the disease. It may be asked whether the initial characters of constitutional syphilis, as expressed in the early eruptive accidents, foreshadow the character of succeeding crops. In general it may be said that when the erythematous exanthem appears after the classic period of secondary incubation, disappears, and is followed by a papular eruption in chronological order, this same uniformity will be maintained throughout the secondary period; but this regularity of development does not necessarily extend to the ulterior evolution of the malady. The benignity of secondary accidents does not afford an absolute guarantee against the malignancy of tertiary lesions. Clinical experience furnishes innumerable examples where a secondary syphilis of mild or medium intensity becomes later transformed into a formidable disease with profoundly destructive lesions.

It is especially the anomalous or irregular forms of syphilis which carry with them an unfavorable prognosis. Unquestionably the early development of a pustular syphilide indicates a severe type of syphilis, since the purulent element is to a certain extent an indication of a bad state of the patient's constitution, which will probably be reflected in the character of the succeeding accidents. Likewise it may be affirmed that the precocious development of deep ulcerative lesions, as is seen in malignant precocious syphilis, when the necrobiotic process invades simultaneously numerous points and advances rapidly over large surfaces, always portends a bad type of syphilis, which may menace the health and even the life of the patient. But even these cases sometimes illustrate the astonishing contradictions and exceptions which characterize syphilis and set at naught the best calculated previsions as to its future course. It may happen that the manifestations of malignant precocious syphilis, after the first crisis is passed, definitely cease, never to reappear. It would seem that the force of the disease is exhausted by the violence of its onset and the intensity of its action, instead of undergoing the progressive enfeeblement ordinarily observed under the corrective influence of time and treatment; so that, whether we have to do with syphilis characterized by an initial benignity or a precocious malignity, the classic expression of the French author is justified: "Qu'en fait de vérole le présent ne saurait jamais être le miroir de l'avenir."

Treatment.—No fact is better established than the susceptibility of the syphilodermata to the action of specific treatment. It can be justly claimed for mercury that it exercises a positive and prompt curative action upon the early manifestations of syphilis; it abates their intensity and hastens their involution. Mercury also undoubtedly exerts a curative action upon the later manifestations. Iodide of potassium is, however, the remedy *par excellence* for the tertiary lesions. The rapidity of its action in melting away gummatous deposits and arresting ulcerative processes is one of the triumphs of scientific therapeutics.

The indications of specific treatment, the methods of its application, and the general principles upon which rational and successful treatment are based, will be fully considered in the chapter on The Treatment of Syphilis.

CLASSIFICATION OF THE SYPHILIDES.

The time-honored division of syphilis into distinct stages, and the grouping of the lesions into secondary and tertiary accidents according to the period of their development, while possessing a certain convenience, is defective as a basis of classification. It assumes a constant regularity in the date and order of succession of the different eruptive forms.

Clinically this regularity of development often fails, and the type of the lesion does not always conform to its position in the chronological scale. There may be a precocious development of deep, ulcerative lesions, while superficial accidents may continue to recur long after the chronological completion of the stage to which they have been assigned. None of the attempts made to construct an entirely satisfactory system of classification, embracing all the pathological phenomena connected with the evolution of syphilis, have been successful.

Hardy disregarded the anatomical form of the lesion, and introduced in his classification an intermediary stage. According to his system, all the cutaneous manifestations of syphilis were ranged in three groups—the early, the intermediary, and the late syphilides.

Mauriac divides the syphilides into two principal groups: the first comprising lesions of the erythematous and papular type representing the virulent stage of syphilis; the second embracing all lesions of the pustulo-ulcerous and tuberculo-gumous type belonging to the constitutional stage of the malady.

According to Zeissl's classification, syphilis is divisible into two stages: the stage of moist papules or condylomata and the stage of gummatous adventitious growths—the morbid processes of the condylomatous stage being regarded as lesions of irritation; those of the gummatous stage as new growths.

Leloir rejects absolutely the chronological division of syphilis, and separates its eruptive phenomena into two distinct groups—resolutive and nonresolutive syphiloma. The so-called *secondary* accidents are essentially resolutive and nondestructive; while every *tertiary* accident is non-resolutive and attended with destruction of the anatomical elements of the tissues in which it develops.

The method of Willan, based upon the anatomical form of the lesions, was first applied by Biett in the classification of the syphilides, and afterward modified by Cazenave. The classification of Cazenave, in which the form and pathological characters of the elementary lesions are chiefly considered, has been adopted by most modern authorities, with modifications in detail rather than in essential principle.

According to this system, the following principal eruptive forms, with their modifications and subdivisions, may be recognized:

- | | | |
|----------------------------|---|------------------|
| 1. Erythematous form... .. | { | Macular, |
| | | Maculo-papular. |
| 2. Papular form... .. | { | Miliary, |
| | | Lenticular, |
| | | Papulo-squamous, |
| | | Moist papular. |

- | | | |
|--------------------------|---|---|
| 3. Pustular form..... | { | Varicella-form or variola-form,
Acne-form,
Impetigo-form,
Ecthyma-form,
Rupial. |
| 4. Tubercular form | { | Tubercular,
Gummatous. |

A fifth division may be advanced to include certain comparatively rare manifestations which relate to anomalies in pigmentation and hæmorrhagic effusions. Thus:

- | | | |
|-----------------------------------|---|-----------------------|
| 5. Extravasation of pigment | { | Pigmentary syphilide, |
| “ blood..... | { | Purpurie “ |

It will be observed that the vesicular or bullous syphilide, which has been by most writers elevated to the dignity of a separate class, is omitted from this classification. Vesicles sometimes form on erythemato-papular lesions from the intensity of the inflammatory process, but their presence is an accidental or accessory phenomenon of exceedingly limited duration. Neither can the bullous syphilide be considered a distinct type, since lesions which begin as bullæ rapidly undergo a purulent transformation. The pemphigoid syphilide is an exceedingly rare manifestation of acquired syphilis; it is almost exclusively found in the hereditary form.

While the erythematous, the papular, the pustular, and the tubercular forms represent the four fundamental types of syphilitic lesions, the combination or blending together of elementary forms has led to the necessity of using compound names, as erythemato-papular, papulo-pustular, papulo-tubercular, pustulo-erustaceous, tuberculo-ulcerous, gummato-ulcerous, etc., in order to more exactly define their anatomical characters. The objective characters of these subvarieties will be noted in the description of the principal types to which they belong. Any system of classification would be indefinitely extended and confused by making separate divisions of the numerous clinical varieties which result from the fusion of the different elementary forms, the transition from one form to another, and the morphological modifications which the same lesion undergoes from the structural peculiarities of the part upon which it is situated.

The terms employed by many writers, such as syphilitic herpes, syphilitic eczema, syphilitic psoriasis, syphilitic lupus, should be discarded from the nomenclature of syphilis, since they lead to a confusion between specific lesions and the idiopathic affections of the skin which they may resemble.

PLATE II.



CHANCRE OF THE LIP, WITH MACULAR SYPHILIDE.

THE ERYTHEMATOUS SYPHILIDE.

The erythematous syphilide, variously known as the macular syphilide, roseola syphilitica, erythema syphiliticum, etc., is the earliest, the most benign, and one of the most common of the cutaneous manifestations of syphilis.

It is important as constituting the first visible manifestation of a general contamination of the system, and in cases where the primary symptoms are doubtful its appearance furnishes the necessary confirmation of the diagnosis. It probably occurs in nearly all cases, but from the absence of subjective sensations and the peculiarity of its localization upon parts which are habitually covered by the clothing it may entirely escape observation. It may happen, also, that when there is a simultaneous development of roseola with a papular or pustular eruption, the faint objective characters of the former may be obscured or entirely lost in the more prominent lesions with which they are mingled.

The outbreak of the erythematous syphilis is usually preceded by the slight constitutional disturbance known as syphilitic fever. It sometimes develops suddenly, its appearance being hastened by an indulgence in alcoholic excess, by a hot bath, by mental worry, by severe physical exercise, or by any cause of cutaneous congestion.

The date of its manifestation is usually about the forty-fifth day after the appearance of the initial lesion, seldom later, although relapses not infrequently occur. In Plate II is represented an erythematous syphilide which appeared about forty days after the chancre of the lip, which is still unhealed. Its development may be retarded, or even suppressed, by specific treatment.

Two principal varieties of the erythematous syphilide are generally recognized, the macular and the maculo-papular. The marked resemblance which syphilitic roseola not infrequently presents to rubeola in the objective characters of the lesions has led many writers to class this variety under a separate division, as *roséole rubéolique*. In exceptional cases the eruption may assume the aspect of scarlatina, and has led to its designation as *érythème scarlatiniforme*. The shades of distinction between the different varieties of syphilitic roseola are not sufficiently pronounced to justify these subdivisions.

Macular Syphilide.—The macular eruption, which is the one more commonly observed, appears in the form of rounded or oval hyperæmic spots, with ill-defined or irregular borders, and raised very slightly or not at all above the level of the surrounding skin. They are from one eighth to one third of an inch in diameter, varying from the size of a small pea to that of a lentil, or finger-tip, or even larger. Their color is a bright pink-rose red, and disappears on pressure; later, they assume a bluish or

ecchymotic color, which changes to a yellowish tint on pressure, and can not be entirely effaced. On disappearing, they leave a brownish-gray mark, more or less persistent. They are seldom attended with desquamation.

The spots vary in number, dimensions, and degree of coloration. In some cases they are few and scattered, while in others they are thickly disseminated, sometimes covering the entire body. They may be so pale as to be hardly perceptible, giving the skin a faintly marbled aspect, or they may be clearly defined and easily visible. A low temperature or sudden chilling of the body brings them out more brightly and vividly, in contrast with the surrounding paler skin.

The eruption appears most abundantly upon the chest and abdomen, the upper portion of the extremities, and the neck; it is more pronounced upon the flexor than upon the extensor aspect. The face and the dorsal surfaces of the hands and feet are usually spared, although in rare instances it begins upon the face; not infrequently it is confined exclusively to the trunk. It is upon the anterior inferior portion of the chest and over the epigastrium that the first evidence of the eruption should be sought for. Occasionally, however, the erythematous syphilide has a more general distribution. In a case of the maculo-papular variety, represented in Plate III, it is universal, involving the face, back of the hands, and practically the entire surface of the body. Its duration varies from a few days to several weeks. By specific treatment its disappearance is oftentimes hastened, or it may gradually merge from the macular into the papular form.

The Maculo-Papular Syphilide is only an exaggerated or advanced development of the macular variety. Its position is intermediate between the macule and the papule, and represents a transition of the one into the other. The eruptive spots are slightly elevated, seated upon an erythematous base, and sometimes covered with fine, desquamating scales.

The papular eminences are small, and variously disposed over the erythematous spot. Occasionally one or more larger papules make their appearance in the center of the erythematous patch. In one variety, which has been designated as the *roséole miliaire*, the mouths of the hair-follicles are chiefly affected, giving a certain projection to the lesions resembling the miliary papular syphilide.

The papular lesions have a tendency to assume an annular arrangement, forming circles or segments of circles, and this, together with its symmetrical distribution, is quite characteristic. After its complete involution syphilitic roseola may recur a number of times. The first relapse usually occurs shortly after the primary eruption disappears, although it may come on at any time during the first or even the second year of the disease. With each recurrence the spots are larger, fewer in number, and paler in appearance.

PLATE III.



MACULO-PAPULAR SYPHILIDE.

Although syphilitic roseola is essentially a precocious lesion, it may exceptionally appear as a late manifestation, coinciding with tertiary accidents. Under the designation of *roséole tardive* has been described an eruption which occurs from after the first to the third year of syphilis in the form of rounded, elliptical, or semianular brownish-red spots, which may be the size of a silver quarter or larger. The lesions are quite superficial, non-elevated, desquamating at the periphery, and always manifest a tendency to clear in the center. Fournier has described a case presenting rounded, oval, brownish, pigmented patches, slightly pityriasis, with clear centers, five years after infection. These late erythematous lesions are little influenced by specific treatment.

The simultaneous development of the erythematous efflorescence with other eruptive forms has been referred to as an occasional phenomenon. There is, however, a coincidence which is of very constant occurrence, and possesses some semeiological importance. In perhaps the larger

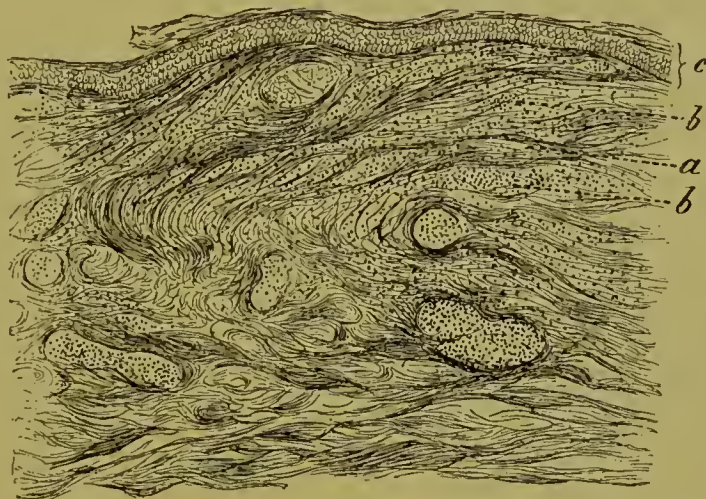


FIG. 1.—Part of a syphilitic macule. $\times 125$ (Crocker).

a, connective-tissue bands of the corium separated by the cell effusion; *b, b*, which is chiefly in force in the course of the vessels; in the upper part of the corium the individual fibers are separated by the inflammatory effusion, and the papillae are flattened out; *c*, normal epidermis.

proportion of cases there will be found upon the hairy regions, more especially the scalp, where syphilitic erythema never occurs, an eruption of small grayish crusts or scabs. These lesions are discrete, and made up of sebaceous secretions. They are easily detached by the comb or the fingers, and as a result of the irritation a purulent element may be added, which concretes into a brownish crust. Similar impetiginous crusts may be found in the beard and mustache.

ANATOMY.—The anatomy of the syphilitic macule has been studied by Biesadecki, Kaposi, Neumann, Crocker, and others. According to Crocker (Fig. 1), the change is limited almost entirely to the upper layers of the corium, mainly the papillary, in rather a sharply defined area. The epidermis is raised up as a

whole, but the cells of the horny layers and rete are normal, as a rule, except where the effusion is greatest and stretches them. Here there may be some elongation of the lowest cells, which may even be so disturbed that the defined line at the junction of the epidermis and capillary layer is lost, the papillæ are more or less flattened out, the fibers of the corium are separated, presumably by the fluid effused, so that the individual fibers can be made out. The contrast between the upper part of the corium with its separated fibers and the normal corium below is very distinct, but there is only moderate leucocytic infiltration, and this almost exclusively round the vessels of the superficial plexus, with their papillary branches; the capillaries and small arteries are moderately dilated, and both stuffed and surrounded with cells; in the walls of the capillaries are prominent nuclei, and there are round spindle-cells in the adventitia of the larger vessels, as was first described by Biesiadecki. There is slight cell effusion around the hair and sebaceous follicles and sweat-duets when they lie in the upper part of the corium, but the sweat-glands and all the structures in the deep part of the corium are normal. Kaposi saw caudate cells in the connective tissue of the papillæ, and Neumann affirms that the change goes right down to the fat. The latter also observed granular pigment in the upper part of the corium, but only in the exudation cells.

Diagnosis.—The erythematous syphilide, although usually quite characteristic, may be confounded with the eruption of rubeola, scarlatina, the erythema following the ingestion of mercury, copaiba, and other drugs, with herpes tonsurans maculosus, pityriasis versicolor, etc. The differential diagnosis, however, is seldom attended with much difficulty. The abundance of the syphilitic eruption upon the chest and abdomen, the exemption of exposed surfaces, such as the hands and face, the existence of induration at the point of contagion, and the frequent presence of enlarged lymphatic glands, usually enable us to readily recognize its specific nature.

Objectively, the macular syphilide most closely resembles the eruption of *measles*. The first appearance of the latter upon the forehead, the suffusion of the eyes, and the catarrhal and bronchial symptoms are sufficient to make the differential diagnosis.

The eruption of *scarlatina* is recognized by the accompanying general hyperæmia of the skin, its punctate character, the high fever, and the characteristic condition of the tongue and throat.

The erythematous eruption occasionally following the internal or external use of *mercury* is confined to certain localities rather than disseminated, and careful examination reveals the presence of numerous minute vesicles. The eruption is itchy, of a bright red color, and promptly disappears after the cessation of the drug.

Roseola balsamica, which may occur after the internal use of copaiba, eubebs, turpentine, etc., has been confounded with syphilitic roseola, and the resemblance of the two eruptions misled the older writers to assert that both gonorrhœa and syphilis were of similar origin. The eruption

produced by these drugs consists of rounded or irregular patches, sometimes coalescing, but usually separated from each other by interspaces of normal skin. These patches are elevated, rosy red in color, and give rise to intense burning and itching. Upon the erythematous surface wheals are often developed. With the *roseola balsamica*, the temperature of the skin is raised and its appearance is accompanied by gastric disturbance. It usually is first seen upon the dorsal surfaces of the hands and feet, and about the articulations. All eruptions due to the ingestion of drugs manifest one distinctive feature—they disappear promptly upon the discontinuance of the exciting cause.

In its declining stages the syphilitic roseola may be mistaken for *pityriasis versicolor*. In the latter affection, however, the stains are lighter brown in color, are not affected by pressure, and are usually found in the form of confluent patches on the back and chest. Furthermore, the pigmentation of pityriasis versicolor is situated in the epidermal cells and may be removed by scraping or washing, while the syphilitic spots are unaffected by these means. A microscopical examination of the epidermal scales will remove all doubt.

From *herpes tonsurans maculosus* the syphilitic roseola is differentiated by the acute onset, the scaling, and the subjective symptoms of the former affection.

Prognosis.—The prognosis of the erythematous syphilide is a favorable one. The eruption represents the most benign expression of the cutaneous manifestations of syphilis, and as it is habitually seated upon nonexposed parts and rarely presents subjective symptoms, it is neither disfiguring nor compromising to the patient and causes no inconvenience. It disappears spontaneously, and promptly responds to the influence of specific treatment.

The eruption has little prognostic significance, so far as the ulterior manifestations of syphilis are concerned; the first crop of roseola does not foreshadow the character of the succeeding crops. When, however, the disease continues to recur during several months in the form of erythema, unaccompanied by deeper lesions, it is a favorable prognostic sign, since it is supposed to indicate a strong capacity of resistance on the part of the individual, and therefore a milder form of syphilis.

THE PAPULAR SYPHILIDE.

The papular syphilide, in the extent of its distribution, the variety of its lesions, its prolonged continuance, and its pathological significance, is the most important of the group of secondary eruptions.

It usually makes its appearance from the fourth to the sixth month—rarely before the end of the third month—and its outbreak is sometimes preceded by febrile reaction. It may immediately succeed or develop

coincidentally with the erythematous form, or it may be indefinitely postponed by early antisyphilitic treatment. Recurring crops of the eruption may appear during the entire secondary stage, and even in the early tertiary stage, and it often merges, by insensible gradations of papulo-tubercles, into the tubercular form. While the earlier eruption is generalized, superficial, and resolute, it is often, at a later stage, limited to the production of isolated groups of papules, the lesions involving the whole thickness of the derma, and disappearing by a process of ulceration and loss of substance.

The chronological period of the papular syphilide is subject to wide variations. While in the immense majority of cases it is not prolonged beyond the first two years, yet exceptionally it may continue to recur, under one form or another, for several years. In late syphilides of the papular type the eruptive elements are no longer disseminated, but are limited to certain localities and disposed in groups with a circular configuration.

The papules consist of a distinctly circumscribed nodular elevation, firm and solid to the touch, from the size of a pin's head to that of a lentil, sometimes considerably larger, resting upon an erythematous base. In form they may be either prominent or flat. In certain cases the papules tend to increase much beyond their ordinary dimensions, sometimes attaining the size of a silver dollar, or even larger. As the process of involution always begins in the central portion, they thus assume a ringed or circinate form which is quite distinctive. The color, at first bright red, changes to a brownish or purplish red and gradually fades. When the papule attains its full development it is covered by a dry, shining skin, exceedingly tense over the surface from the cellular infiltration, and which, upon desquamating, leaves a sort of collar of broken, partly detached epidermis around the periphery.

While the papular syphilide may be distributed over the entire surface of the body, involving the trunk, head, and limbs, it manifests a predilection for certain regions. The dissemination of the lesions is generally regular, but in certain localities they show a tendency to become massed and more compact, as, for example, upon the brow, along the naso-labial folds, beneath the mammary gland, and especially about the natural orifices, as the mouth, the anus, and the genital parts.

The papular lesions are markedly modified in their objective characters by the structural peculiarities of the tissues upon which they are situated and their stage of development. Upon the general integument the papules are dry and desquamating; upon the hairy scalp they appear scabby; where the skin is in folds, and opposing surfaces are maintained in contact, as about the mammary glands and in the genital and anal regions, the papules are moist, the desquamation being replaced by a

viscid secretion, and the lesions often taking on an exuberant development, sometimes attaining large dimensions. Where the epidermis is thick and corneous, as on the plantar and palmar surfaces, they assume a peculiar scaly form, which has been compared to that of psoriasis, and has given rise to the designation of *psoriasis plantaris and palmaris*.

At the angles of the mouth and the interdigital folds they are apt to crack, giving rise to deep rhagades or fissures which are exceedingly painful, and, when the feet are involved, interfere with locomotion. In certain localities they manifest a marked tendency to repeated recurrence and a most inveterate obstinacy to treatment. Upon the palms and soles, for example, they may persist in presenting much the same aspect for years.

ANATOMY.—According to Cornil, the microscopic examination of early syphilitic papules shows very distinctly the evidences of inflammation, deeper than would at first be supposed. Examination of thin sections of the skin at the seat of the papule shows the surface slightly elevated, the superficial epidermis



FIG. 2.—A syphilitic macule of the first period of the secondary lesions. $\times 80$ (Cornil).

e, superficial epidermis; *m*, rete mucosum; *b*, vessels of the papillæ; *v*, vessels of a sudorific gland; *s*, *a*, spaces filled with pus around the vessels; *f*, lymphatic cleft; *g*, fasciculi of fibers of connective tissue separated by normal cells.

sometimes increased in thickness, sometimes partly desquamated, the most superficial layers of cells being deficient.

Fig. 2 shows the superficial epidermis *e e* arrested at the base of the elevated papule, and the pointed summit of the papule presents on its surface a layer of corneous epidermis reduced to half its thickness. The Malpighian layer is a little thickened. Beneath the rete mucosum are found the vessels *b* filled with

blood. The capillary vessels *v* which surround the sudorific glands, as well as the vessels of the derm, are also filled with blood. The connective tissue of the papillæ is normal; sometimes around the capillary vessels we observe numerous effused lymph-cells in the peripheral connective tissue.

In the deeper connective tissue the ducts and lobules of the sudorific glands, and all the vessels of the derm beneath the papule, are surrounded by a more or less thick zone of lymph-cells which have passed out of the vessels and have collected along their course, separating the fasciculi of fibers of the connective tissue.

In Fig. 2 are seen islands of lymph-cells, relatively large collections surrounding the blood vessels at *a a*. The fasciculi of fibers of the connective tissue show in this drawing their normal arrangement and interlacing. The migration of white blood-corpuscles is very limited, confined to the area around the blood-vessels. It is noticeable that the inflammation, though not intense, is not limited to the superficial layers of the skin or to the papillæ, but extends deeper into the dermic layers: as far as the region of the lobules of the sudorific glands and of the subcutaneous cellulo-adipose tissue. In this lesion the connective tissue of the derm is not changed, but retains its proper elasticity, and is swollen only by the vascular congestion and by the effusion of cells around the vessels. This explains why pressure with the finger in forcing back the blood contained in the vessels partly causes the redness and tumefaction to disappear; but these symptoms reappear as soon as the pressure is removed.

In the squamous lenticular papule the corneous as well as the mucous layer of the epidermis is thickened; the cells of the granular layer and the dentated cells of the rete mucosum frequently present in places an excavated state of their protoplasm; the prolongations of the rete mucosum which penetrate between the papillæ are larger than normal, while the papillæ themselves are elongated and hypertrophied. The papillæ are greatly changed by the chronic inflammation; their fundamental substance is infiltrated with small round or lymph cells and cells of the tumefied connective tissue. The fibrils of the connective tissue are separated by cellular elements. The papillary vessels are dilated and filled with blood. In the larger, older papules there is not only an inflammation of the papillæ and the superficial corium, but the inflammatory process may affect the entire derma and extend into the subcutaneous cellular tissue.

According to their form, volume, and other objective characters, the lesions of this syphilide have been classified as follows: The miliary papule, the lenticular papule, the squamous papule, and the moist papule or mucous patch. This division does not imply four distinct varieties, but indicates rather the varying form which the papular type of eruption assumes according to its location and the mode of its evolution. Not infrequently they may all be found co-existent on the same subject.

The Miliary Papular Syphilide.—The small or miliary papular syphilide (*lichen syphiliticus*) is perhaps the most infrequent variety of the papular form of eruption, representing a proportion of less than ten per cent. It is somewhat more common in the female than in the male. It consists essentially of an infiltration of the follicular structures. It appears



MILIARY PAPULAR SYPHILIDE. (Piffard.)

rapidly in the form of minute, conical, or pointed projections, the size of a pinhead or millet-seed, grouped in circles or segments of circles, each group consisting of a collection of from ten to forty lesions. These efflorescent spots are distributed over large surfaces, principally invading the face, neck, back of shoulders, and the sternal region, the intermediary surfaces being free from the eruption. The eruption is at first bright red, gradually fading to a brownish-red, and leaving after the disappearance of the papule a bluish-red stain. During its early stage the summit of each papule may be surmounted by minute pinhead-sized vesicles, which upon drying form an epidermal scale. The vesicular stage of the papules is exceedingly short, lasting only a few days. In some cases the acuity of the process may result in the formation of a minute pustule which dries into a small crust. When this drops off it leaves a minute depression corresponding to the mouth of an excretory duct of a sebaceous or hair follicle. Fresh lesions develop among those already desquamating and the eruption may continue for three or four months before definitely disappearing (Plate IV).

In another variety of the miliary syphilide the papules are larger, more globular, less numerous, and not so characteristically grouped. The epidermal covering exfoliates, and is detached from the summit, forming a white collarette around the base of the lesion. The miliary papular syphilide, instead of being restricted to certain localities, may have an exceptionally extensive distribution. At the present time I have under observation a diabetic patient in whom there was an acute generalized eruption of miliary papules six weeks after the chancre. The lesions are grouped in patches the size of a silver three-cent piece. These groups are so numerous and closely approximated as to be confluent in certain places. The eruption is practically universal. Upon the lower extremities the grouped arrangement is lacking, but the entire surface is thickly studded with dark-red conical projections, giving it the aspect of lichen pilaris. Upon the face, hands, and feet the character of the eruption is different, consisting of larger lenticular papules.

It is quite common to observe, in connection with small papules upon the trunk a coincident eruption of larger papules scattered here and there over different parts of the body.

Diagnosis.—There are a number of papular lesions of non-specific origin with which the miliary papular syphilide may be confounded.

Lichen scrofulosorum, in the size of its lesions and their grouped arrangement, bears a striking resemblance to the small papular syphilide. The papules of the former are of lighter color, either a pale yellow or the same tint as the normal skin, and upon their disappearance do not leave discolored depressions. Lichen scrofulosus occurs almost exclusively in childhood, and the eruption is nearly always limited to the trunk.

The miliary syphilide has a much more extensive distribution, and is accompanied with confirmatory evidence of its specific nature.

Lichen planus may also be mistaken for the small papular syphilide; the efflorescent groups of papules are, however, larger, umbilicated, more strongly pigmented, and quite pruriginous.

Psoriasis punctata. Only in cases where the miliary papules are closely aggregated, and the seat of abundant desquamation, do they bear a resemblance to a diffused patch of psoriasis. The desquamating scales of the specific lesions consist of thin, yellowish epidermal layers which never become confluent like the scales of psoriasis. Minute examination shows that the papules have not coalesced but are simply coherent at their bases, the contours of their summits perfectly distinct and covered with small scales, while the surface of a psoriatic patch is more or less uniformly covered with large, flaky scales. Psoriasis frequently appears upon the hairy scalp, ears, and other localities when the miliary syphilide rarely occurs.

Herpes circinatus has been mistaken for the small papular syphilide when it assumes a distinctly rounded or circinate configuration. The vesicles of the former are quite evanescent, drying up into small scales and forming a circle of scales upon a slightly inflamed base. The disease undergoes rapid involution under local treatment. Microscopical examination of the scales, revealing the presence of the characteristic spores, would remove all doubt.

From *scabies*, which it may resemble somewhat, the miliary papular syphilide may be readily differentiated by the acute itching accompanying the former—the excoriations caused by the violent scratching and by finding as its causative factor the *acarus scabei*.

Prognosis.—Although the miliary syphilide is often rapid in its development, giving rise to the designation of the “acute miliary syphilide,” it is chronic in its course and slow in its evolution, often persisting for several weeks without notable modification. It does not seem to be so readily amenable to the influence of specific treatment as the other forms of the papular syphilide. Relapses are rare. They occur in groups or in the form of circles or arcs of circles. The recurring lesions are usually of the papulo-pustular type.

Two forms of the flat papular syphilide are recognized, the lenticular and the nummular syphilide, the chief element of distinction between them being the size of the lesions. They are distinguished from the preceding acuminate variety by their character of flatness. Compared with the projecting miliary papule the lesion gains in superficial area what it loses in height. The anatomical site of the infiltration in the papillary body, instead of the follicles, determines the difference in form.



LENTICULAR PAPULAR SYPHILIDE (Piffard).

The Lenticular Papular Syphilide.—This eruptive form is by far the most common and characteristic of the secondary manifestations of syphilis. The papules are rounded or oval, flatly convex, with sharply defined borders, and but slightly elevated. The color, at first bright red, later assumes a burnished or coppery hue. In no other lesion is the syphilitic trait so characteristically displayed. The lesions are at first small, and only gradually attain their complete development. As the papule advances in its evolution the surface undergoes a metamorphosis, the epidermis becomes shiny and red, and breaks in the center and desquamates, forming an epidermal fringe around its periphery. This process of desquamation may take place several times in succession, the papules gradually becoming flatter and finally disappearing by resolution, leaving brownish or bluish-gray spots of pigmentation which are very persistent. The invasion of the lenticular syphilide, though often preceded by an eruptive fever, is not nearly so rapid as the “acute papular syphilide.” A few lentil-sized spots appear upon the forehead, the nape of the neck, or the abdomen, and the eruption extends by the development of new spots and the gradual implication of the different parts of the body until it becomes more or less generalized, usually requiring one to two weeks for its full development. The eruption comes out in successive crops, which may continue to recur during the first eighteen months or two years of the disease. It not infrequently happens that there is a *poussée subintrante* before the former crop has undergone complete resolution, and there are thus present at the same time papules of various ages and different stages of development (Plate V).

The distribution of this syphilide is most extensive; it may be disseminated over the entire integument. Its regions of predilection are the forehead, the back of the neck and shoulders, the sacral region, and the bend of the elbows and knees, where they often tend to coalesce. They are quite common upon the palms, rarely found upon the dorsum of the hands and feet, but over the arms they are less numerous than over the forearms. The development of the lesions upon the brow along the margin of the hairy scalp constitutes a distinctive feature, known as the *corona veneris*.

In the earlier months the entire surface of the body may be thickly studded with the eruption, the papules sometimes running together and spreading in a continuous sheet over large surfaces, but with each successive outbreak there is a diminution in their number with a progressive increase in their size. The later outbreaks are limited to the production of a few papules, grouped in circumscribed localities, which have a tendency to assume a circular configuration. In certain regions, as upon the prepuce and sheath of the penis, the papular efflorescences, which are more or less configurate, forming discoid or annular patches, may

appear precociously before there is any eruption upon the general surface.

The Nummular Syphilide.—Under the designation of the large papular or nummular syphilide is included a variety in which the papules, while preserving the general characteristics of the flat papule, are distinguished by their larger dimensions, often attaining the size of a silver half dollar, or even larger.

The lesions present a firm, well-defined border, with a smooth, plain surface. Sometimes the margins are elevated, with a shallow depression in the center, which gives them an umbilicated appearance. The desquamating epidermis is detached from the center and forms a peripheral fringe. The tendency to repeated desquamation is quite characteristic of this, as it is of the lenticular papule. In the course of the retrogressive metamorphosis the nummular papule often undergoes a transformation into the annular papule. The umbilicated character of the lesion becomes more accentuated by atrophy of the central portion, which gradually disappears, while the peripheral margin remains hard, elevated, and scaly, resulting in a ring-shaped wall of infiltration inclosing a smooth, depressed center. A similar circinate configuration may result from the linear contact of smaller papules developed in the form of a circle.

Instead of the circinate or discoid form, the papules may be arranged in sinuous or serpentine rows, which by their confluence give to the eruption a peculiar figured or gyrate form.

Still another eruptive form, known as the stellate syphilide, or the *syphilide en corymbe*, is produced by the circular grouping of small papules around a large papule as a center. These smaller "satellite" papules, as they are termed, are disposed in a system with almost geometric regularity. As a rule they are discrete, and separated by sound skin; they may, however, become confluent, forming a circular nappe of infiltration around the central lesion.

A polycyclic configuration, designated as the *syphilide en cocarde*, may result from the development of one or more concentric rings encircled by a larger ring.

The intricate and eccentric forms assumed by the papular syphilide from the intersection and interfusion of circular, semilunar, and elliptical patches, give to the eruption a most bizarre appearance, which is admirably shown in Plate VI.

The chronological period of the large, flat papule is ordinarily toward the end of the secondary stage, and it is described by many writers as an intermediary syphilide. Exceptionally it may occur as an early manifestation. While the individual lesions are few in number, they have an extensive distribution. It is most characteristically developed upon the face, nape of neck, the genital parts, and the palmar and plantar surfaces.



CIRCINATE SYPHILIDE. (from photograph by Piffard.)

In the genital region they are moist, with a sero-purulent, offensive secretion, and become the seat of fissures and superficial ulcerations.

The Papulo-squamous Syphilide.—Under the influence of various causes, syphilitic papules undergo certain modifications which impart to them a characteristic physiognomy of great interest from a clinical point of view. One of the most important modifications of the papular type is represented by the papulo-squamous syphilide (Plate VII). Its essential features consist in a thickening of the superficial layer of the skin, with marked proliferation of the epidermal elements. Instead of the ephemeral desquamation, which is common to all papules in the process of involution, there is an accumulation of epidermic scales which rest in place, forming a sort of scaly covering strikingly suggestive of psoriasis, and which has led to the designation of this syphilide as syphilitic psoriasis. The scales are of a dirty grayish tint, dry, thick, and usually friable. Sometimes they are hard, horny, compact, and closely adherent. Any or all the varieties of papular syphilide are susceptible to this squamous process. A papular eruption may present this psoriatic physiognomy from the first, or it may be impressed upon the lesions secondarily at a later stage of their development, or not until the period of their decline. (Plate VIII, large papulo-squamous syphilide).

Clinically, it is observed that papules of the late secondary or intermediate stage, which are ordinarily of larger size and more deeply situated, are more apt to exhibit this tendency to epidermal thickening and exfoliation, so that the chronological element is an important factor in the production of this morphological feature. Again, it has been observed that the squamous tendency is more apt to be manifest in certain regions. Thus, upon the face, along the eyebrows and chin, the nasolabial and the naso-jugal furrows, and especially upon the palms and soles, the tendency of papules to become scaly is manifest. But, independent of these regional predispositions which are constituted by structural peculiarities, a predominant influence must be attributed to idiosyncrasy, since it has been observed that in certain persons all papular lesions, irrespective of their age, dimensions, or locality, are characterized by an excessive scaliness. This psoriasiform aspect of syphilitic lesions has led many authorities to regard them as a combination of psoriasis and syphilis, or a syphilis ingrafted upon a psoriatic diathesis. In opposition to this view it may be said that many syphilitics in whom the squamous type of eruption is most pronounced have never had an attack of psoriasis.

The mildest expression of the squamous process, and one which from its comparative rarity possesses but little clinical importance, is termed *syphilitic pityriasis*. It consists essentially in a desquamation from irregularly distributed, rounded or annular, slightly elevated surfaces, of

minute furfuraceous or branny scales. A more pronounced scaliness is often seen in the papular syphilide of the face, which is characterized by a granulo-squamous proliferation of the surface, each of the papules being surmounted by a dry, hard, horny concretion of a grayish color.

As before intimated, the squamous element is most characteristically developed in the larger and more persistent papular lesions of the late secondary period. By the contact and fusion of the annular patches are formed festooned and gyrate figures, covered with dry, more or less thick, friable, and compact scales, which are closely adherent, and which bear a most striking resemblance in objective characters to *psoriasis figurata* or *gyrata*. In other cases there is an agglomeration of papules, forming large masses or infiltrated patches of considerable dimensions, the surface covered with white adherent scales.

Upon certain regions, the alæ of the nose and around the mouth, especially the upper lip, and about the genital organs, there is often a papillary hypertrophy in addition to the epidermic proliferation, which gives to the lesions a warty, papillomatous character, known as the *syphilide papuleuse végétante*, which will be described in detail later on. The surface of the vegetating papules is ordinarily covered with scales and yellowish concretions chiefly composed of sebaceous secretions from the glands so abundantly present in these localities. Upon the hairy regions of the face the epidermic *débris* is often mingled with the secretion of the lesion, forming a crust rather than a scale, constituting the *papulo-crustaceous syphilide*.

Diagnosis.—The diagnostic features of the lenticular syphilide are so characteristic and typical that it may, as a rule, be readily differentiated from other papular eruptions. Its color, localization, symmetrical development, the absence of subjective sensations, and the frequent association of other signs of syphilis in the shape of glandular enlargements, alopecia, and mucous patches, resolve all doubt as to its specific nature.

In the later relapsing stages, when the eruption is sparsely developed in the form of large papules, which have a tendency to become scaly and assume the aspect and configuration peculiar to *psoriasis*, the diagnosis may be difficult. Syphilitic lenticular lesions may resemble those of *psoriasis guttata*, larger papular lesions those of *psoriasis nummularis*; circinate lesions those of *psoriasis orbicularis*. It is especially the large papulo-squamous lesions of comparatively late development, which by their contact and coalescence assume a configuration so strikingly suggestive of the figured and gyrate forms of *psoriasis*, that present the most deceptive resemblance, and are most difficult of differentiation.

When, however, the lesions are minutely examined, differences in the character of the scales and the condition of the subjacent infiltration will be at once noted. The syphilitic scales are smaller, thicker, less abundant,



PAPULO-SQUAMOUS SYPHILIDE.

in the objective characters of palmar and plantar lesions are the firm adherence of the cutis to the subjacent fascia, and the thickness and non-detractibility of the corneous layer. On account of the resistance of the epidermis the papules are flat, with scarcely an appreciable elevation. They first appear as dull red or almost colorless circumscribed spots, from the size of a pea to that of a finger-nail. They usually first develop in the center of the palms, and extend by concentric circles or with a serpiginous course to the periphery. They sometimes creep up over the lateral surfaces of the hands and feet and the interdigital spaces, but rarely appear upon the dorsal surface. The epidermal covering is gradually lifted up, broken, and partly detached in a dirty white lamella, which adheres at the edges, leaving in the center a bright red circular or angular spot surrounded by a border of undermined skin.

In a variety designated by many writers as the *corneous syphilide*, which is more common upon the palms than the soles, the pathological modifications seem to be centered in the corneous layer, which is elevated in the form of extremely hard conical projections of the epidermis. These horny, epidermal concretions may be dug out of the skin, leaving small crateriform depressions. The circular pits corresponding to each papule may give it the appearance of being punched out with an instrument. Under the same designation Zeissl describes "a diffuse affection of the epidermal strata of the hands and feet, which consists of a uniform, diffused, rapid degeneration of the most superficial layers of the skin, whereby the affected places look as if the epidermis were transformed into a fine, whitish silver brocade."

The papules, instead of remaining discrete, may coalesce, forming circular or crescentic patches, which show a tendency to heal in the center while advancing by the development of new papules in the periphery. The fusion of the papules and this serpiginous mode of extension may convert the entire palm into a diffuse lesion—the somber-red base corresponding to the parchmentlike derma—with active desquamation going on in the scalloped infiltrated borders which surround it. This desquamative process may continue for months without other active signs of eruptive disorder.

In the natural furrows of the palms and fingers deep cracks or fissures are apt to occur, sometimes extending down into the true skin and occasioning much pain and inconvenience. The chronicity of syphilides in this region is no doubt largely due to the fact that the lesions are constantly aggravated by pressure, friction, and other causes of irritation to which they are exposed.

Plantar syphilitic lesions, while not so common, often coexist with those of the palms, and present essentially the same objective characters. From the fact that the soles are comparatively protected, and not exposed

PLATE VIII.



ANNULAR PAPULO-SQUAMOUS SYPHILIDE (Fordyce).

to so many causes of external irritation, the lesions are not so persistent. On account of the great thickness of the epidermis in this region, when fissures form they are apt to be deep and exceedingly painful, and not infrequently become of the seat of extensive ulcerations which are extremely difficult to cure.

The earlier palmar and plantar syphilides are usually symmetrical, but in a more advanced stage only one palm or sole may be affected.

Diagnosis.—The designation of the papulo-squamous syphiloderm of the palms and soles as *palmar* and *plantar psoriasis* would indicate a marked resemblance or identity of the objective characters of the lesions of the two diseases. Practically, however, the identification of the syphilitic character of the eruption is rarely attended with difficulty, since psoriasis occurs with such extreme infrequency upon the palms and soles that it may be excluded from consideration. Psoriasis is never strictly limited to these regions, but when found here is always associated with a development of the disease upon the extensor surfaces of the knees or elsewhere. On the other hand, the palms and soles are a favorite seat for the papulo-squamous syphilide, which becomes, so to speak, domiciled here, and may constitute the sole sign of the disease for years. In fact, it may be said that a psoriasiform eruption upon the palms is almost pathognomonic of syphilis.

The dermatosis with which syphilis of the palms is most apt to be confounded is *eczema*. When the syphilide occurs in the form of discrete papules, a mistake is not liable to be made: the dusky red infiltrated spots deprived of epidermis, with their peripheral scaly fringe, are quite characteristic; but when the papules coalesce, forming large, diffuse patches of infiltration with a sweeping circinate border, the resemblance to certain forms of chronic squamous eczema is most striking. Usually, however, a differential diagnosis may be made by a consideration of the following points: Syphilis generally begins in the middle of the palm and spreads centrifugally by the contact and fusion of new papules; the coppery wall of infiltration which marks its advancing border is scalloped and irregular; its outer edge sharply defined, and terminating abruptly against the healthy skin. Eczema usually begins first on the wrist or root of the thumb or fingers, or it may first appear on the dorsum of the hand or fingers, where syphilis is rarely found. The eczematous infiltration, if of long duration, is more uniform and evenly distributed; the margin of the eczematous patch is more regularly curved; and the infiltration does not terminate so abruptly, but shades off into an erythematous redness of the surrounding skin.

Eczema is further distinguished by its severe itching, the history of discharge, moisture, and its characteristic crusts. Itching of the affected surface is absent in syphilis. The only subjective sensations result from

the accidental cracking and fissuring of the skin. In old cases, however, the differential lines which distinguish the two affections are obliterated, and a positive diagnosis is not possible without resorting to the test of specific treatment. Even this, it must be confessed, is not infrequently disappointing, since of all manifestations of syphilis the palmar and plantar lesions are most refractory to its influence.

The Moist Papular Syphilide.—Another important modification of the papular type of syphilitic eruption is represented by the *moist papule* or *mucous plaque* of the skin. The metamorphosis consists essentially in a loss of the epithelial covering of the papule, leaving a moist secreting surface, hence sometimes designated as the papulo-erosive syphilide. This form of syphilide derives a special clinical importance from its frequency, its tendency to relapse, its diagnostic significance, and from the fact that it constitutes one of the most common sources of syphilitic contagion.

The transformation of the dry into the moist papule is determined largely by the accident of situation and other local conditions. Its development is favored by fineness of the skin and consequent thinness of the epidermis, warmth, the friction of adjacent surfaces, and contact with secretions or exudations. It is found in regions where the skin is thin and delicate and bathed in perspiration, and where contiguous surfaces come in contact, as in the natural folds or creases of the skin, beneath the breast, the navel, in the axillary, inguinal, and genito-crural regions, the interdigital spaces, and especially at the junction of the skin and mucous membrane around the natural orifices, as the anal and genital. It is much more common in women than in men; in the former it not infrequently constitutes the sole manifestation of syphilis during its entire period.

The moist papule ordinarily begins as a flat elevation, circular or discoid in form, varying in dimensions from one eighth to one half inch in diameter, the larger lesions not infrequently presenting a depression in the center with elevated borders, giving them an umbilicated appearance. The epidermal covering, instead of breaking and exfoliating in the form of a dry scale, as in the dry papule, becomes macerated by moisture, and gradually transformed into a grayish, easily detached pellicle. After this is cast off there remains a flesh-colored plaque with a moist secreting surface, soft to the feel like mucous membrane; hence the designation *mucous patch*.

While in most instances moist papules represent a surface modification of the dry papule, yet it is well to bear in mind that they may have a different evolution. They may originate from an erythematous spot, an eczematous erosion, or they may develop *d'emblée* without a pre-existing lesion. The initial lesion may be transformed *in situ* into a mucous patch. They assume a variety of appearances according to their

situation and the local conditions to which they are exposed. The surface may become covered with a grayish-white diphtheroid layer, or present an uneven, verrucose aspect. The patches may become superficially ulcerated and the seat of a viscid, purulent, extremely offensive secretion. The exudation may become mingled with the epithelial detritus and concreate into a brownish crust, giving them the aspect of pustulo-crustaceous or impetiginous lesions; coincident with these surface changes there is oftentimes a marked hyperplasia of the papillary body, imparting to the papules a distinctly vegetating character, and has led to their designation as *condylomata lata*. Instead of the papules remaining discrete there is commonly a coalescence of contiguous lesions, forming irregularly shaped, flattened masses or cauliflower growths, the surface being broken up by longitudinal or polygonal fissures which channel the mass in different directions. The opinion is generally held that these vegetating masses are not essentially and exclusively syphilitic, but for their production certain local causes are necessary, such as uncleanliness, the contact of irritating secretions, friction, pressure, etc.

Moist papules present great variations in their objective characters according to their situation upon the integument; *beneath the mammae*, which is a favorite location in fat women with full, pendulous breasts, the papules are large, smooth, circular or crescentic, slightly eroded, or covered with a thin impetiginous crust. Not infrequently they are grouped *within or about the areolæ*. Moist papules about the female nipples have a most important relationship with the syphilis of nurslings, constituting as they do from their ultra-contagiousness, and their frequent opportunities for contact with the infant's mouth, the most common sources of infection in infantile acquired syphilis.

In the *axillæ* the papules are large, erosive, and frequently confluent; in the umbilical folds they are small, moist, and rarely confluent or incrustated.

In the *interdigital spaces*, between the toes especially, the fingers being rarely affected, the papules, owing to the secretion and the pressure of close contact, instead of being simply erosive, are often papillomatous and hypertrophied, with clefts and fissures and deep ulcerations, which often extend along the articular folds upon the plantar or dorsal surface, causing such intense pain as to interfere with locomotion. The secretion from the surfaces is most foul and offensive.

About *the mouth at the commissure of the lips* the papules frequently occupy both the cutaneous and mucous surfaces, and are often complicated with fissures extending more or less deeply into the angles of the mouth, and exceedingly painful. In this situation the cutaneous segment of the patch is covered with a dry, brownish, and fissured crust, while the mucous portion exhibits the frank appearance of the mucous plaque.

It is especially in the *genital regions*, along the scrotum in the male and about the vulva in the female, and around the anus in both sexes, that moist papules exhibit their most characteristic and exuberant development. In the perineal region and upon the scrotum the lesions are rounded, nummular, of a reddish-gray tint, moist and secreting, and generally discrete, although they sometimes occur in grouped patches. Around the anus the lesions are frequently ranged along either side in a longitudinal line, like a row of buttons. Owing to the friction and pressure to which the papules are subjected in this location, combined with the macerating action of the secretions, they often become enormously tumefied, hypertrophied, and fissured, and are attended with more or less itching and burning, with reflex spasm of the sphincter ani.

About the female genitals they may be either isolated or confluent, forming by their aggregation warty, nodular, or cauliflower masses of considerable size. They are frequently complicated with dermatitis, inflammation of the vulvar glands, œdema of the vulva, etc. The labia majora may become enormously infiltrated or hyperplastic, giving rise to a sclerosed rigid condition which in pregnant women becomes a serious obstacle to parturition.

For a more detailed description of syphilitic manifestations in these regions the reader is referred to the articles on Syphilis of the Rectum and Anus, and Syphilis of the Genito-Urinary System.

The chronological period of the moist papular syphilide is usually limited to the secondary stage. If the lesions become hypertrophic and are not subjected to a curative treatment, they may persist almost indefinitely, forming large papillomatous masses resembling frambœsia. While they do not exhibit the same tendency to spontaneous resorption as do other secondary lesions, yet the condylomatous growths sometimes break down and disappear by a process of ulceration, which, however, does not involve the cutaneous tissues upon which they are implanted, so that cicatrization is rarely followed by a loss of substance. Moist papules prove most refractory to the influence of specific medication. The tendency to relapses and the pertinacity with which they continue to recur constitutes a most aggravating feature. Cases are reported in which they have been observed ten, twenty, and even thirty years after the initial lesion.

ANATOMY.—According to Kaposi, in broad condylomata, as in the syphilitic nodule, a cellular infiltration is present throughout the papillary layer and the corium, which occasionally extends into the subcutaneous cellular tissue and appears to be pretty sharply demarcated laterally toward the adjoining normal tissue. The limits of the papule are indicated by the portion whose morbid condition is marked by the cell infiltration. The papillæ are considerably enlarged, mainly in their longitudinal diameter, terminating above in two or three branches, frequently with club-shaped ends, as seen at *a*.

In the more recent condylomata, as well as in the peripheral part of the

moist papule, the mucous layer is considerably thickened, its conical processes are elongated and broadened, as seen at *b*, and is pretty sharply differentiated from the tissue of the papillæ; only through the central portions of suppurating ulcerating papules this distinction becomes obscured, because the granular, almost dusty appearance of the infiltrated papillæ continues into the cells of the mucous layer, the latter is thinned or absent at the ulcerated portions, the

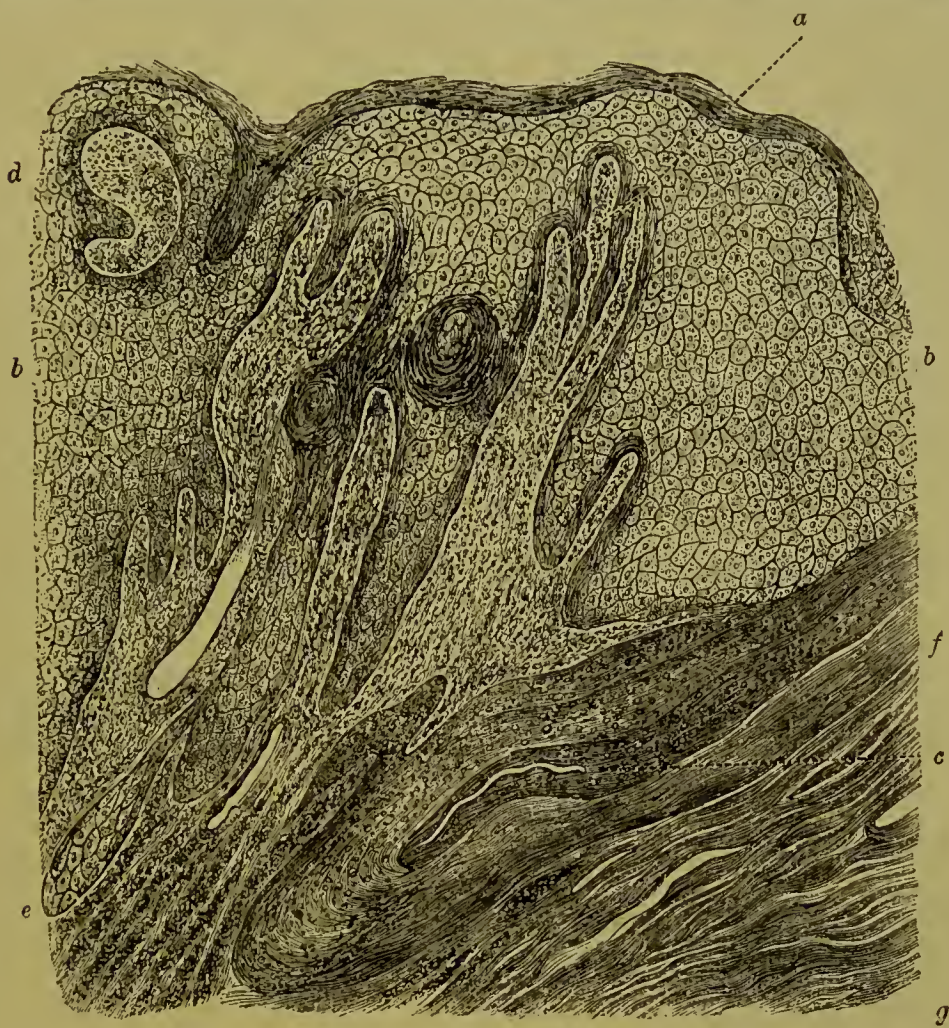


FIG. 3.—Section of flat condyloma taken from living subject (Hartnack, oc. 3, obj. 5). (Kaposi.)

a, club-shaped and branching hyperplastic papillæ; *b*, abnormally developed cells of mucous layer; *c*, corium with cellular infiltration; *d*, hair with hypertrophic external root-sheath; *e*, transverse section of an infiltrated papilla; *f*, *g*, normal dermal tissue, histological limit of the flat condyloma.

mutilated papillæ or the suppurating corium with its vertically ascending loops of papillary vessels being freely laid bare.

Under a higher power it can be recognized that the papillary tissue and the corium corresponding to the extent of the papule are uniformly altered by the cellular infiltration, *a*, *e*.

The cells vary in size and shape; most of them are of the size of a white blood-corpuscle, some are almost twice as large, and many represent only a cell nucleus; among the cells some are roundish, oval, irregular in shape, and some provided with taillike processes.

Both the cell-bodies and the nuclei are, without exception, very granular; this granular appearance of the cell-body continues also into the processes where these are present. Cells may be found whose nucleus seems constricted in the center; others attract attention by their size, more than double that of a white blood-corpuscle; in these the pale, gray, glossy nucleus constitutes the major portion of the cell, which exceeds it only by a narrow zone of the cell-body. This nucleus is sometimes found completely split into two. At other points we find within a circular space, resembling one of the latter cells, five or six bodies similar to small cell nuclei, which are grayish, have a dull luster, are infiltrated with granules, and packed close together, seemingly inclosed in a common envelope.

The cells constituting the infiltration are imbedded in a network composed of meshes varying in size and shape, but mostly close, and extending throughout the infiltrated tissue—i. e., the entire papule; one or more cells lie in each mesh, or the latter may be filled by one of the larger cells described above, or by a mass of nuclei (five or six) presumably due to the breaking down of a cell; partly, however, the cells are imbedded in the trabeculæ of the network, which is subdivided into larger segments by coarser diverging fibers from the old connective tissue of the corium, which run without interruption for considerable distances; within these the finer and closer fibers and trabeculæ of the network become visible. The latter increases in density toward the border of the vessel wall and merges with the network of that vessel.

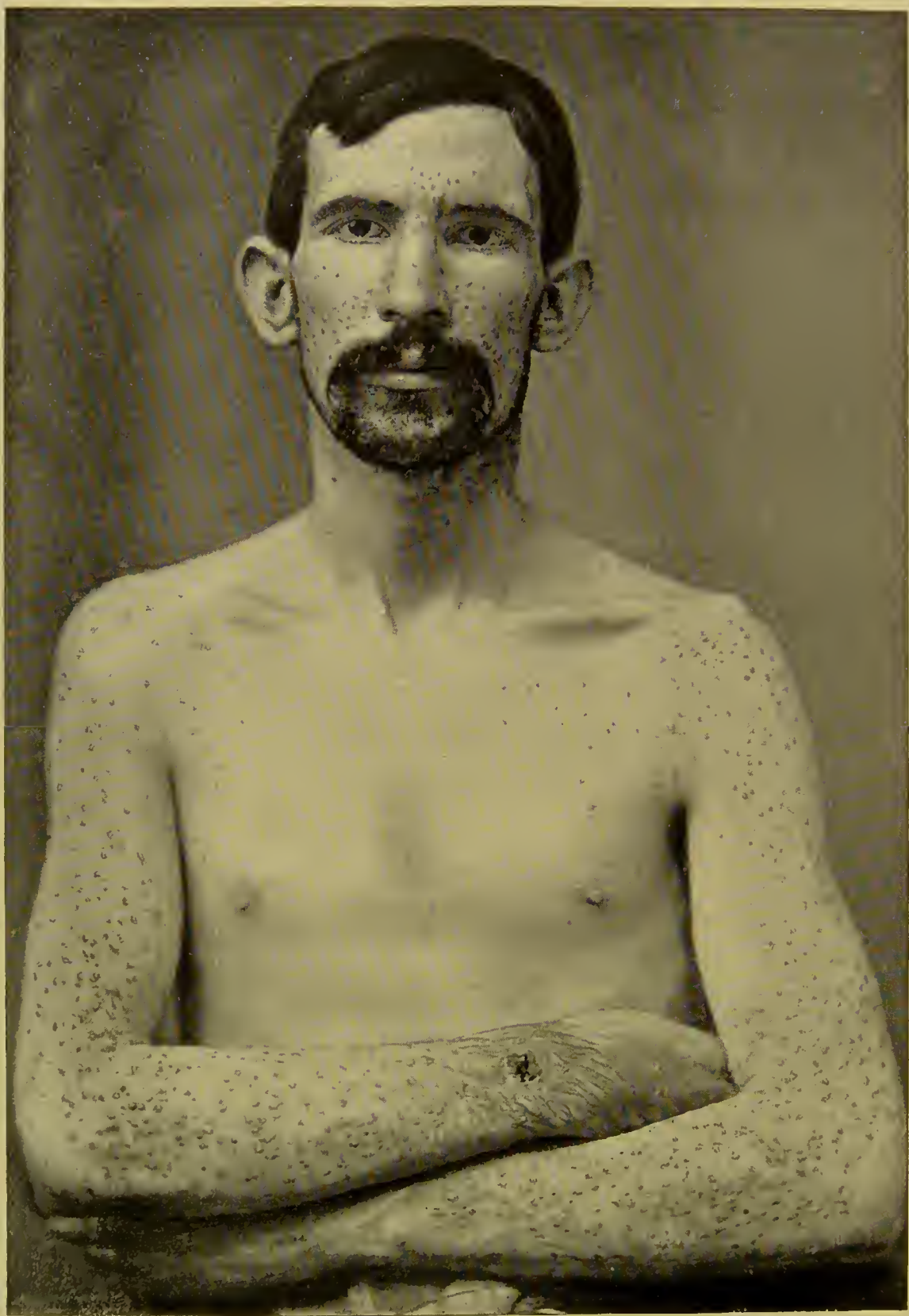
The vessels appear unaltered in their lumen; their adventitia widened and interspersed with numerous cells and nuclei, which separate into a network; the nuclei of the capillary wall seem enlarged and multiplied.

The cells of the rete Malpighii are striated; many exhibit vacuoles, constricted or double nuclei; over the disintegrating portions of the papule they appear, where still present, in a state of granular opacity, irregular in outline, and broken down.

Diagnosis.—The restriction of the lesions to certain localities, and the characteristic forms they present, are almost pathognomonic. The differentiation of the moist papule from the initial lesion, the papulo-erustaceous, impeitiginous, and annular forms of syphilide, is of little practical importance.

The lesions with which condylomata lata are most apt to be confounded are the *vegetations* caused by gonorrhœal, chancreoid, and other irritating conditions, but which are not of syphilitic origin. The gross objective characters of the broad and acuminate condylomata are by no means identical, while closer examination will reveal marked differences in their anatomical structure. The fig-shaped papules of syphilis are as broad at their bases as at their summits, while the acuminate vegetations are distinctly pedunculated, with a branched dendritic character of growth. These salient points of difference may, however, be effaced under certain conditions. When the simple papillomatous growths are subjected to pressure from the constant contact of opposing surfaces the acuminate projections may be flattened out, assuming a mushroom

PLATE IX.



PAPULO-PUSTULAR SYPHILIDE.

shape, with a comparatively smooth surface, while exceptionally the flat condylomata may assume a decidedly acuminate form. The history of the case, with the presence of concomitant signs of syphilis in other localities, will generally serve to clear up the diagnosis.

THE PUSTULAR SYPHILIDE.

Much confusion has been introduced into syphilography by the numerous divisions and subdivisions of the eruptive forms, and the different names applied to the same lesion in the different phases of its evolution.

Under the general division of pustular syphilides will be classed all those cutaneous lesions of syphilis whose essential and distinguishing feature consists in an elevation of the epidermis by a fluid exudation. By most authorities vesicular syphilides have been described as a separate class; but there is no essential difference between the vesicular and pustular syphilides either in the character of the pathological process or in the subsequent changes they undergo. While certain lesions unquestionably exhibit a distinct vesicular appearance in the early period of their evolution, the vesicular element is, as a rule, exceedingly transitory, and soon undergoes a purulent transformation. The pustule represents the acme or completion of the pathological process, while the vesicle is only a stage in its development, as is exemplified in the mode of evolution of smallpox pustule.

In the *varicella-form syphilide*, for example, which may be taken as the type of the papulo-vesicle, the lesion is primarily papular; a serous or sero-purulent exudation uplifts the epidermis, forming a pinhead to a pea-sized vesicle, which soon assumes a puriform condition. The preliminary vesicular change is often so rapid as to be practically indistinguishable. Similarly in the lesions of the *herpetiform syphilide*, so named from the disposition of papulo-vesicles in a circinate form, resembling herpes circinatus, the serous exudation rapidly becomes puriform. Another variety, described as the *eczematous syphilide*, possesses little clinical importance from its exceeding rarity. Many of the cases so described are doubtless examples of an eczematous eruption which has become impressed with specific characteristics from its development in a syphilitic subject.

All lesions of the pustular type originate from an elementary papular infiltration. They may be acuminate, rounded, or flat. They vary in size, and in the extent and depth of the purulent softening. The purulent metamorphosis may affect only the apex, or involve the papular infiltration in its entirety, and later the structures of the corium in which it is seated. Plate IX represents a papular syphilide undergoing a pustular transformation. Many of the variola-form lesions on the arms present a distinctly visible purulent apex, which feature is less marked in the acne-

form lesions of the face. On the right wrist a group of lesions have become superficially ulcerated.

The chronological period of the pustular syphilide has wide limits. It may occur as the first manifestation of cutaneous syphilis. Ordinarily the more superficial forms are ranked among the secondary accidents, while the deeper or more destructive forms, as the pustulo-erustaceous and pustulo-ulcerous, develop coincidently with other distinctively tertiary lesions. The essential character of the former is their tendency to terminate by resolution, while the latter are more persistent, extend peripherally, and leave upon healing indelible cicatrices. Deep and generalized pustular lesions are the most frequent expressions of malignant precocious syphilis.

A reference to the older writers would seem to indicate that the comparative frequency of pustular lesions has been materially diminished in recent years, as such accidents formerly occupied a much larger figure in the description of the eruptive forms. This decrease is doubtless due to better stamina, improved modes of living, habits of cleanliness, etc., and diminished exposure to those conditions which act as factors of gravity in syphilis.

While observation shows that the production of pustular lesions is determined largely by the character of the soil, and are incomparably more frequent in the weak, the debilitated, and the cachectic, yet exceptionally they may develop in persons of strong and vigorous constitution. Independent of conditions of the general health, we must recognize the existence of a local predisposition to this type of lesion. The skin of certain individuals exhibits a greater aptitude to the formation of pus. This pyogenic tendency may be awakened into activity by both internal and external causes of irritation, and is equally manifest in common non-specific disorders of the skin occurring in such individuals.

Reference has already been made to the theory, advanced with some plausibility, that pustulation is not the product of syphilis but the result of local infection. According to this theory the pustular syphilide is a hybrid manifestation involving two essential factors—the action of the syphilitic virus being limited to the cell-infiltration, while the pustular element owes its origin to secondary infection with pyogenic micrococci. Undoubtedly the serpiginous mode of extension of the isolated pustulo-ulcerous lesions of the tertiary stage would seem to conform to this hypothesis of a local infecting process; but the same pathogenetic mode can not with equal propriety be invoked for the earlier pustular eruptions, which are essentially exanthematic in their sudden outbreak and generalization. In this class of cases there would seem to be a morbid spontaneity on the part of the organism to the production of pustular lesions.

The early occurrence of severe pustular lesions always indicates a bad

type of syphilis, since it is the expression of a depraved state of the patient's constitution. Jullien has called attention to the fact that voluminous glandular engorgement is a common concomitant of the pustular syphilide. This gloomy prognosis is deepened by the fact that mercurial treatment is much less potent in its influence upon eruptions of the pustular type. Deep ulcerative lesions often prove refractory to specific treatment, while they heal readily under the influence of local antiseptics and stimulants.

ANATOMY.—The anatomical characters of the syphilitic pustule are thus described by Kaposi: There is a sharply limited dense infiltration extending



FIG. 4.—Vertical section of acne-form pustule (Hartnaek, oc. 3, obj. 5). (Kaposi.)

a, infiltrated papillæ in neighborhood of a hair-follicle; *b*, hair; *c*, *c'*, pus cell-heaps within hair-follicle; *d*, *f*, *g*, normal dermal tissue; *e*, *f*, infiltrated papillæ and corium, in the center of which is a small abscess, *h*.

through the whole papillary body, and with varying depth into the corium, occasionally as far as the subcutaneous cellular tissue; it consists of formed elements which with some degree of regularity, from the older to the more recent portions, progresses either toward absorption or toward purulent disin-

tegration. In the pustular syphilide the two modes of retrogression are combined in such a way as to give the product externally a pustular character.

Only in the most superficial layer of the syphilitic papule is the pus produced which raises the epidermal covering in the shape of a pustule; the purulent disintegration does not progress deeper into its substance even where it enlarges beyond its original boundaries. As in the papular forms (squamous), the greater part of the infiltration is absorbed.

Within the confines of these general anatomical relations two histological variations occur in the pustular syphilide. The one corresponds to the efflorescences of the small and large pustular syphilide; the other to the rupia type. The efflorescences of the two first-named forms, as a rule, include a hair-follicle with its adnexa, the cellular infiltration constituting the papule being deposited in the tissue surrounding the follicle (papillæ and corium). If pus be found in the most superficial strata and in the rete, the pustule will appear not only above but also inside the hair-follicle; cell proliferation and exudation will take place in the region of the external root-sheath, and when excessively developed an intrafollicular abscess will result. A large number of transitional forms, from the small papular to the pustular syphilide, will be found.

In the larger forms of pustule leading to the development of rupia the histological conditions are still simpler. The cellular infiltration affects a larger territory, that, as a rule, extends no deeper than the median layer of the corium. The most essential feature is the occurrence of distinctly outlined, very granular, opacified, nucleated (pus) cells, and free nuclei within the uppermost stratum of the corium and papillary layer and in the rete, inclosed in a succulent, œdematous, large-meshed tissue, or even in free spaces, above which the epidermis bulges (as the cover of the pustule). This condition corresponds to the acme of the process for every single point of the diseased patch, varying, however, according to the age of the local disease. In any case, it corresponds first to the center of the patch, and in the course of time progresses toward its periphery. At the involved points is observed an atrophied papillary body, or else the thinned corium runs in a straight line, covered with a thin pigmented or nonpigmented mucous layer.

In vertical sections the portion of the infiltrated spot which is in a state of purulent disintegration, appears sharply demarcated externally, limited by the peripheral portion of the infiltrated tissues (papillæ).

The Varicella-form Syphilide.—This eruptive form results from the transformation of lesions primary papular into papulo-vesicles and papulo-pustules from the intensity of the inflammatory process. The lesions do not necessarily have a follicular origin, since they may be found in localities where sebaceous glands do not exist, as the palms and soles. They show a preference for the forehead, sides of the trunk, and flexor surfaces, where the skin is fine and delicate.

The lesions begin as small, dull-red, infiltrated spots, the epidermis over which becomes elevated by the effusion of a serous or sero-purulent fluid. The lesions are at first convex, from the size of a lentil to that of a pea, and surrounded by a well-defined coppery areola. In the course of a few days they become flattened or depressed in the center, from the

partial absorption of the fluid contents. The epidermal covering gradually shrinks, and with the dried contents forms a thick, adherent crust of a brownish or greenish-black color. The fall of the crusts leaves brownish-red or stained depressions, which persist for some time.

The eruption, which is frequently one of the first of the secondary manifestations, usually lasts from three to six weeks, but its entire period may be prolonged to several months by the successive development of new crops. While the lesions are usually discrete and scattered, they may exceptionally become confluent. Zeissl has described this form, under the title of *varicella syphilitica adultorum disseminata*, which is chiefly remarkable for its rarity.

A modification of this eruptive form has been described as the *varioliform syphilide*, which is distinguished by the hard, shotty, umbilicated character of the lesions, which are identical in objective characters with those of smallpox. Liveing, Hutchinson, and others have reported cases in which the differential diagnosis was in the first instance impossible. Hutchinson says: "The simulation of the variolous eruption by syphilis is the most marked example of 'syphilitic imitation.' The papules are elevated, shotty to the finger, have depressed centers, affect the same regions as variola, and resemble it so absolutely that nothing but the history of the case can help the surgeon to a correct opinion."

Elsewhere I have reported (On the Diagnosis of Smallpox, Journ. Cutan. and Ven. Dis., March, 1886) numerous cases taken from the records of the New York Board of Health, where syphilis has been mistaken for smallpox, and the patients have been sent to the smallpox hospitals for suspected variola.

Diagnosis.—This syphilide derives an added clinical importance from the objective identity of its lesions with those of variella and varioloid; the resemblance is heightened by the frequent concomitance of more or less marked febrile disturbance.

From *varicella* it may ordinarily be distinguished by the slow evolution of the efflorescence, the less pronounced character of the initiatory fever, and the absence of the redness, heat, and other signs of inflammatory disturbance of the skin. In syphilis the skin is pale and muddy, the lesions are less tense and full, slower in development and longer in duration; in variella the eruption comes up more promptly and the transitional changes are more rapid. A cardinal point of distinction is that variella is essentially a disease of childhood, while syphilis is commonly found in adult life.

The similitude of syphilis to *variola* is sometimes so accurate as to deceive even the most experienced physician. There is not only identity of anatomical forms, but also of evolution through the stages of papule, vesicle, and pustule. The simulation is heightened by the fact that in

some cases the outbreak of the syphilitic eruption is ushered in by high fever, and the lesions are surrounded by an areola and present well-marked umbilication. The differential points are the history of the case, the more sluggish development and course of the syphilitic lesions, the absence of subjective symptoms, and the presence of other evidences of syphilis. In all such cases the element of time resolves all doubt. The rapid transitional stages of the variolous lesions do not occur in syphilis.

The Acne-form Syphilide.—This syphilide has received its designation from the objective resemblance of its lesions to those of acne vulgaris. Its anatomical site is in the follicular structures, both the sebaceous and pilo-sebaceous glands, being implicated. It has a predilection for regions rich in sebaceous glands, as the scalp, face, back of neck and shoulders, and hairy portions of the chest, but it may have a more general distribution. Upon the hairy scalp it is one of the most common and precocious of the secondary manifestations. Reference has already been made to the fact of its occurrence in this locality in connection with the erythemato-papular syphilides upon the general integument, constituting one of the most pathognomonic signs of syphilis.

Ordinarily it invades the integument by successive implication of different regions—first the face, then the chest, and later the upper extremities, each outbreak being attended with febrile disturbance.

Upon the integument the lesions consist of small acuminate or conoid elevations, which soon become surmounted with minute pinhead-sized pustules. The pustulation is confined to the apex, and does not involve the base of the papular infiltration. The contents of the pustules desiccate and form with the ruptured epidermis a thin scab or crust. The fall of the crust shows minute dermic depressions or pits. After decrustation the papular base becomes the seat of desquamation, which may take place a number of times before it undergoes involution, leaving a grayish or brownish ecchymotic stain which is slow in disappearing. The suppurative process rarely invades the derma sufficiently to leave a cicatricial trace.

The lesions are usually discrete; they may be disseminate or grouped. The more generalized efflorescence is designated as *acne syphilitica disseminata*. When the lesions are disposed in groups and patches, the term *acne syphilitica conferta* is applied to the eruption. Exceptionally the lesions become confluent; in certain localities the massed lesions assume a verrucose aspect.

The duration of the eruption is usually from six to eight weeks. Relapses are prone to occur, while new crops are liable to come out before the complete involution of the old ones, so that the entire duration of this eruptive form is usually protracted. Occasionally the acne pustules become transformed into deep ecchymatous lesions.

Diagnosis.—As the name implies, *acne syphilitica* presents certain analogies in form, follicular seat, and localization of its lesions with those of *acne vulgaris*. In *acne* there is an entire absence of febrile disturbance; it is most characteristically developed at the period of puberty with a limitation of the lesions to particular localities. In syphilis the febrile movement is often marked; it may occur at any period of life, and it frequently develops upon the limbs and other portions of the body where simple *acne* is never seen.

Marked differences are observed in the mode of development, objective features, and course of simple and specific *acne*. In *acne vulgaris* the eruption has not the character of an exanthem; the lesions come out singly, are of different sizes, and interspersed with comedones. The *acne* pustule has an inflamed, nonindurated base; the suppurative process is slower and more profound, the purulent softening often extending to the bottom of the follicle, and even involving the perifollicular structures; it is more furuncular in character; a purulent cone may be pressed out; permanent scars often result. In syphilitic *acne* the pustular process is more superficial, more rapid, the crusts not so thick or adherent. The papular base is more dense, distinctly defined, and presents the characteristic coppery coloration. After the elimination of the pustular apex the papular base persists for some time, undergoing a slow involution without leaving scars. Other signs of syphilis are commonly present.

Similarly *iodic and bromic acne* may be mistaken for the acneform syphilide. The same points of distinction will serve for their differentiation, although in the case of drug *acne* the eruption is more rapid in development, more general in distribution, and is not limited by age or localized in certain regions.

The eruption of *scabies*, which has been sometimes mistaken for syphilis, may be distinguished by its more polymorphic character, its absence from the face and head, and its localization upon the hands, buttocks, and genitals, where the pustular syphilide rarely occurs, and finally its marked subjective sensations and the presence of the characteristic furrows.

The Impetigo-form Syphilide.—This syphilide, consisting of small, superficial pustules, discrete or grouped, surrounded by an areola, and resembling simple impetigo, represents one of the commoner forms of pustular eruption.

The lesions originate from pea-sized infiltrations, the exudative process uplifting the epidermis, forming roundish or irregular flat pustules. The puriform exudation soon becomes transformed into yellowish or greenish-black crusts. Upon lifting up the crust there is seen a superficial ulceration, which involves only the upper layers of the corium. The duration of the pustular element is brief, lasting only a few days,

but the crusts are very persistent. If detached, they rapidly form again, and often remain adherent until the reparative process is complete. In Plate X there are seen impetigo-form lesions on the brow, face, and chest. Some of the larger lesions on the arms and legs are ecthyma-form in character.

When resolution takes place the crusts rapidly fall off, leaving a violaceous or coppery-red pigmentation, which gradually pales into a whitish hue. Not infrequently there remain permanent traces in the shape of superficial cicatrices.

Another mode of development is by the confluence of a number of small pustules, grouped upon an erythematous base and surrounded by a distinctly defined areola. The crusts may become heaped up, forming thick concretions of a yellowish-green color, covering a granular, eroded surface.

The lesions of the *confluent impetiginous syphilide* may attain considerable dimensions by the development of new pustules at the periphery, presenting the appearance of an annular elevation around the crust. This purulent ring is soon converted into a circular crust, and the central lesion continues to enlarge by the development of these concentric zones of ulceration. Instead of this circular mode of extension the lesion may heal at one side while new foci of ulceration form at the other, giving it a reniform or serpiginous shape. By the fusion of contiguous serpiginous lesions the ulcerative process may involve extensive surfaces, sometimes covering half the face or one side of the scalp.

In the variety known as *impetigo rodens* the ulcerative process, instead of being limited to the superficial layers, involves the entire thickness of the skin. The removal of the crust reveals an ulceration with abrupt edges and a pultaceous floor, strikingly suggestive of the appearance of soft chancre. The secretion is, however, more concrescible, and rapidly dries into a crust. In deep destructive action this form presents a great similarity to the ulcero-crustaceous lesions which characterize the tertiary stage of syphilis. It is more frequently found in the strumous and cachectic, and its early occurrence indicates a grave type of syphilis.

The benign form of impetigo, characterized by superficial discrete lesions, has a predilection for the face, especially the hairy portions around the lips and sides of the face, the naso-labial furrows, and the genitals. The confluent form is also most characteristically developed upon the hairy scalp and the genitals. It sometimes occurs on the extensor surfaces of the limbs, more rarely upon the abdomen and back. It causes considerable disfigurement, and when involving the scalp and beard it may destroy the hair-follicles, and thus produce permanent alopecia. In Plate XI, representing a pustulo-crustaceous syphilide, the impetiginous crusts



PUSTULAR SYPHILIDE.

are massed about the eyebrows along the naso-jugal and naso-labial furrows, the upper lip and chin, with superficial ecthymatous lesions on the trunk and extremities.

The chronological period of the milder form of the impetiginous syphilide is confined to the secondary stage. The deeper destructive variety, except when occurring as a precocious manifestation of malignant syphilis, is essentially a late manifestation.

Diagnosis.—The impetigo-form syphilide may be mistaken for *impetigo vulgaris*, the objective characters of the lesions being almost identical in certain cases. In impetigo vulgaris the invasion of the eruption is more acute, and attended by more or less heat and itching of the skin; the course of the lesions through the various stages of pustulation, concretion, and decrustation is much more rapid, and the inflammatory areola disappears when the crust forms. The crusts are lighter in color, more dense, more brittle, and intimately adherent to their bases. The lesions of syphilis are more indolent in their evolution, the crusts are darker, more porous, more easily lifted up, and the areola persists after their formation. The presence or history of other signs of syphilis is usually found.

From *sycosis* impetigo syphilitica may be differentiated by the objective characters alone. In sycosis the suppurative process is deeper, more furuncular in character, and attended with more or less brawny infiltration of the skin. In syphilis the process is more superficial; the hairs fall out and do not grow again; there is often a coincident development of pustular lesions on the hairy scalp and elsewhere. In sycosis the disease is limited to the hairy portions of the face, and does not extend to the scalp. It is not followed by permanent alopecia.

From *impetiginous eczema* the confluent impetiginous syphilide may be distinguished by the more sharply defined periphery of the lesions, the character of the crusts, and the absence of subjective symptoms. In eczema the discharge is thinner, forming yellowish, flaky scales, and is attended with intense subjective sensations.

The Ecthyma-form Syphilide.—This eruptive form is also designated as the large pustular syphilide; according to the extent and depth of the ulcerative process and the rapidity of its extension, it has been divided into two varieties, the superficial and the deep.

Superficial ecthyma constitutes one of the late secondary manifestations, and does not differ essentially from the impetigo-form syphilide, except in its seat of predilection and the larger size of the pustules; while situated habitually upon the lower extremities, it may have a more extensive distribution upon the side and back of the neck, inguinal and gluteal regions, and exceptionally upon the trunk.

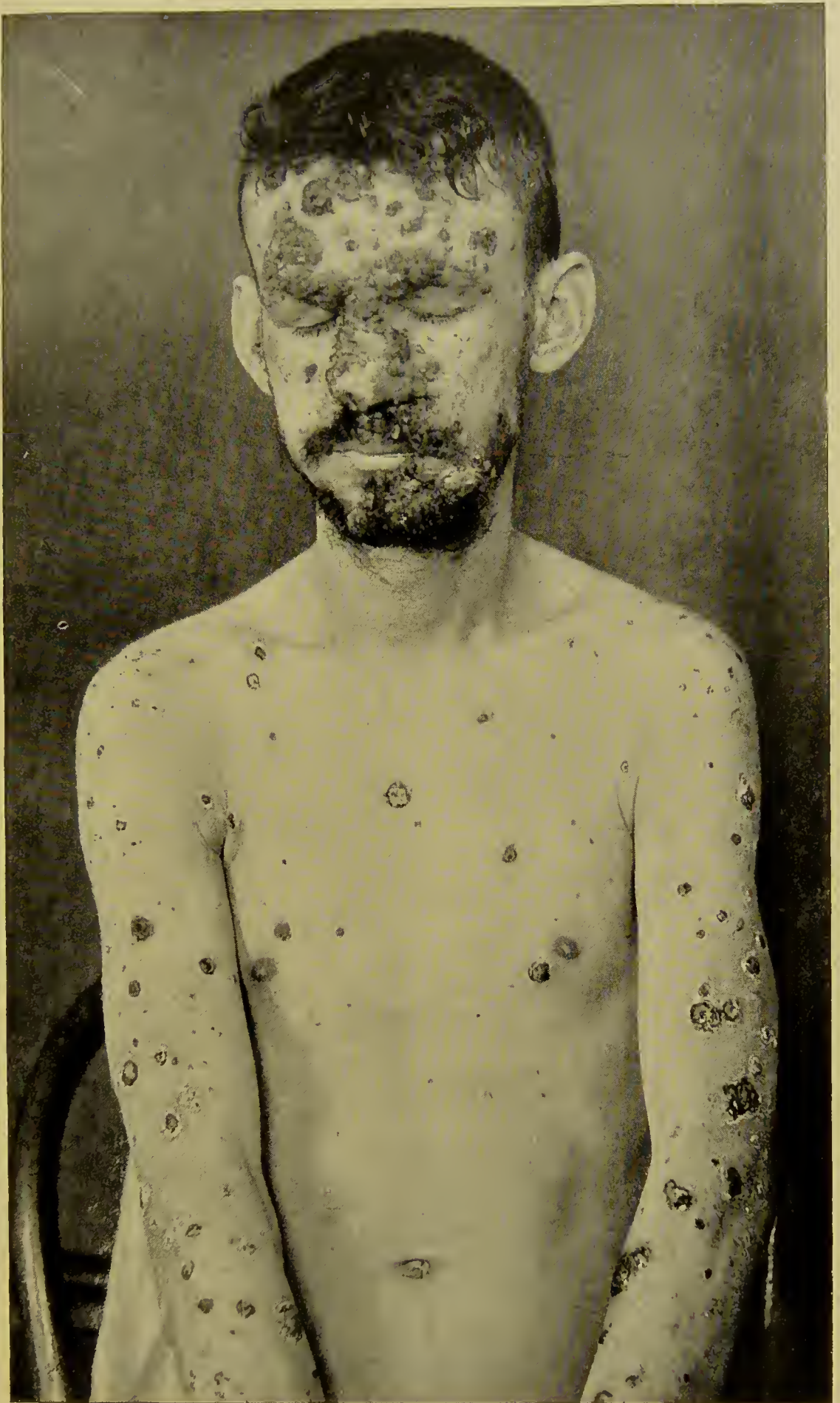
The *deep ecthyma-form syphilide* is usually a late manifestation, except in malignant syphilis, when it appears precociously. In the extent

and depth of its destructive action it is the most formidable of the pustular group. Its development appears to depend largely upon the character of the soil, as it is incomparably more common in the cachectic. It is not limited to the lower extremities, its habitual seat, but may be found upon the shoulders, the arms, and elsewhere.

In the *superficial variety* the pustules develop upon a reddened base, the periphery of which becomes infiltrated, forming a red zone. The contents of the pustule consist of a turbid puriform exudation often mixed with blood. After a few days the covering of the pustule collapses in the center and the contents desiccate in the form of a thin, blackish-brown crust, beneath which ulceration takes place; in this variety the erosion involves only the upper layers of the skin. In the course of its involution granulations form at the base and the crust is gradually detached, leaving a papular eroded elevation, upon which a crust may reform a number of times before the reparative process is complete. The coppery, pigmented areola which surrounds the spots remains for a long while.

In the *deep variety* the primary infiltration is more marked and often papular in character, the ulceration is more profound and extensive, the crusts are thicker, the areola is of a vinous red, and the resorption of the neoplasm is followed by an indelible cicatrix. When the crust of a deep ecthymatous ulcer is removed there is revealed a punched-out or excavated ulceration, with a grayish, dark-brown, or livid, sometimes gangrenous floor, covered with a tenacious mass of molecular detritus, the cavity secreting a purulent fluid mixed with blood, which rapidly concretes into the reformation of a greenish-black crust. The ulceration often extends beyond the margins of the crust, which is soon surrounded by a purulent furrow or ring. This condition is produced, according to Mauriac, as follows: "The borders of the ulceration in their centrifugal course surpass those of the crust, which, without being detached, becomes mobile, and seems to float upon the ichorous pus superabundantly secreted beneath it."

The reparative process, which is usually sluggish and protracted, is marked by a thinning of the secretion, the thickened borders become effaced, the floor clears up and becomes covered with healthy granulations. It is not rare for the crustaceous element to persist until the complete healing of the ulcer. The red, depressed scars are for a long time surrounded by a coppery areola, and gradually fade into a smooth, dead-white color. Ecthymatous cicatrices are peculiar and characteristic, giving a clear imprint of the character and extent of the ulcerative process which has caused them. When the lesions are discrete they are circular in contour; when extensive surfaces have been involved by the confluence of ulcerations of uneven depth, causing in some places partial and in others complete destruction of the skin, they present the appearance of



PUSTULO-CRUSTACEOUS SYPHILIDE.

patches of more or less normal skin, with remains of its follicular structure, relieved here and there by perfectly white, depressed cicatrices where the ulcerative process has penetrated deeply and destroyed the skin in its entire thickness.

The chronological period of the deep ecthymatous syphilide is the intermediate and tertiary stages. Its course is always chronic. Not infrequently, by the confluence of lesions of this type, vast surfaces of ulceration are formed, accompanied by fever of a hectic character and other severe systemic symptoms.

ANATOMY.—The histology of the deep ecthymatous pustule has been studied with great care by Cornil. Fig. 5 represents the edge and a portion of the surface of one of these pustules magnified twenty diameters; the epidermic crust covering the pustules is absent from *m* to *m'*, but from *m* to *t*, in all the

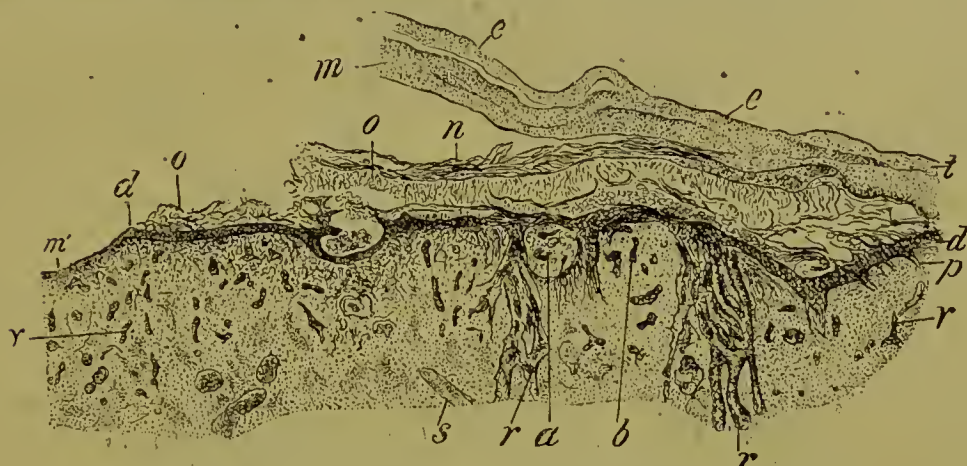


FIG. 5.—A part of a deep-seated ecthymatous pustule. $\times 20$ (Cornil).

e, e, superficial epidermis corresponding to the scab of the pustule. This layer has fallen off at *m*; it is continuous at *t* with the normal epidermis; *n*, a portion of the corneous epidermis infiltrated with pus-corpuseles; *o*, cavities filled with pus; *d*, rete mucosum; *a, b*, papillae; *p*, papillae placed between the normal and changed papillae; *r, r*, prolongation of the rete mucosum belonging to the hair-follicles and sebaceous glands; *m'*, ulcerated part forming a flat surface and covered with a thin layer of flat cells; *v, v*, dilated vessels; *s*, fasciculi of smooth muscular fibers.

portion *e, e*, it is in place, and is continuous at *t* with the healthy skin. At the edge of the pustule, in the region included between *d* and *t*, the epidermic layers are in place and are infiltrated with pus; the layer *n*, which appears under a less power as a network with fine meshes, belongs to the corneous stratum; the layer *d* represents the rete mucosum.

Passing from the edge of the pustule toward its center, the cells belonging to the rete mucosum form a thin stratum, *m*, and then disappear, leaving the papillae uncovered and suppurating. The papillary layer is easily discernible, and the papillae *a* and *b* are larger than in health. Near the margins of the pustule, but nearer the center, they have run together; their extremities are no longer distinguished, and they form a uniform layer, from the free surface of which extend the lymph-cells with which they are filled. In the figure, *r, r*, represent the epidermic prolongations which surround the hair-follicles and penetrate the acini of the sebaceous glands; the blood-vessels *v, v*, are much dilated and congested.

The changes undergone by the epidermis in the region included, *n* and *d*, which is the Malpighian layer devoid of crusts, are reproduced, magnified two hundred and fifty diameters, in Fig. 6.



FIG. 6.—Section of epidermic layers at the margin of an ulcerated eethymatous pustule, part of preceding figure seen with higher powers. $\times 250$ (Cornil).

a, surface of the corneous epithelium, the cells of which form a limiting reticulum of the cavities; *e*, filled with pus-corpuscles; *d*, larger cavities; *e*, *e*, layers of corneous cells with smaller cavities; *f*, *f*, *f*, large cavities having lost their pus-corpuscles; *f*', one of these large cavities containing pus-corpuscles; *h*, free cells; *g*, *g*, free cells excavated by a cavity; *g*', one of these cells excavated and erenated; *i*, a free cell containing two nuclei; *i*', a free cell containing blood-corpuscles; *m*, excavated cell forming a part of the partition of a large cavity; *t*, layers of corneous cells more or less excavated with cavities; *b*, layers of cells with indentations. The rete mucosum extends from *b* to *r*. *o*, cells of the granular layer; *p*, one of these cells excavated with an oval cavity, the nucleus of which has disappeared.

In the first layer are found cavities filled with pus-cells, the thin walls of which are made up of flattened corneous cells. These cavities are of variable size, and have their long diameter parallel to the surface of the skin. The smaller cavities of the subjacent layer *e* are cavities in epidermic cells. Below



RUPIAL SYPHILIDE

this layer is found a zone of large cavities, *f f f*, which were originally filled with free pus-cells, their walls found by easily demonstrable corneous cells, some of which are detached and appear in profile, as at *h*, or in full view, as at *g*, and the latter often contain a small, empty cavity and have crenated or indented edges. These walls often show notches, as at *f'*, and irregular branching processes, as is the case in all suppurations occurring amid epidermic cells.

There are also found, besides lymph and pus-cells of the usual dimensions, some large cells containing two nuclei, *i*, or many nuclei, and even some cells containing red blood-corpuscles, *i'*. In the layer *t* are seen ramifying cells excavated with small cavities containing pus; larger cavities are also observed. Finally comes the layer of large spinous cells, either separated or united together. The granular structure presents a certain regularity, and the nuclei of the cells are sometimes preserved, as at *o*, and sometimes absent, and the cells excavated with a cavity, as at *p*. The spinous cells of the rete mucosum *r* are larger, and almost invariably have a cavity around the nucleus, which latter is often atrophied, replaced by granules, or absent. A part of a papilla may be seen at *s*.

Diagnosis.—This syphilide may be confounded with *ecthyma vulgaris*. The lesions of the latter are, however, more furuncular in character, more painful, not surrounded by a coppery areola, and the suppuration is more superficial, with less tendency to form crusts. Varicose ulcers of the leg have also been mistaken for syphilitic ecthymatous ulcers. A recourse to specific treatment may be necessary to establish the differential diagnosis.

The Rupial Syphilide.—This is one of the most typical lesions of syphilis; indeed, the presence of characteristic rupial crusts may be regarded as pathognomonic (Plate XII).

The elementary lesion may be a flat pustule, or a bulla filled with a serous or blood-stained fluid, which rapidly becomes turbid and purulent, and is surrounded by a livid inflammatory areola. The epidermal covering ruptures, and the contents dry into brownish or greenish-black crusts, under which ulceration takes place. The initial crust represents the size of the original lesion, but as the ulceration extends at the periphery the crust becomes thickened by the addition of successive layers from beneath, each new layer giving it a broader base, while increasing its height, until finally the primitive coagulum forms the apex of a cone-like crust, made up of stratified layers, which may be one, two, or three inches in diameter. Sometimes the ulcerative process extends more rapidly at one segment of the ulcer, the lesion assuming a reniform shape, the grayish or blackish-brown crusts rough and furrowed upon the surface, giving them the appearance of limpet or oyster shells. Not infrequently the ulceration creeps along in a serpiginous course.

If the crust is forcibly removed, there is revealed an indolent-looking ulcer, with abrupt, undermined edges, secreting a serous pus mixed with blood.

The reparative process is announced by the fall of the crust; the base of the ulcer becomes covered with healthy granulations, which become converted into cicatricial tissue. The cicatrices of rupia are smooth, white, shining, and often reticulated. The course of a rupial eruption is usually protracted, lasting two or three months, but it may be prolonged for several months, by the development of new crops.

Rupia is usually ranked as a late secondary accident. In strumous, cachectic, or debilitated subjects it may develop much earlier, within the first few months, when its outbreak is usually preceded by febrile disturbance.

Rupia may occur as a generalized eruption; it is more common on the face, neck, and extremities. The number of the lesions is usually in inverse proportion to their size; the ulceration is comparatively superficial, irrespective of their dimensions. The conical stratified crusts of rupia are so characteristic and typical that they are not likely to be confounded with the lesions of any other disease.

Pustulo-Ulcerous Syphilides.—From the foregoing description it will appear that the group of pustulo-crustaceous syphilides repre-



FIG. 7.—*Impetigo rodens* of scalp.

sented by *impetigo rodens*, *deep ecthyma*, and *rupia* have many points of resemblance. They are similar in their anatomical formation, the pathological process involving the deep layers of the skin and leaving permanent scars. They are identical in their mode of evolution, all pass-

ing through the stages of infiltration, pustulation, suppuration, and reparation. Ulceration is their distinctive and most characteristic feature; it may be complicated with phagedena or assume a serpiginous mode of extension.

They differ somewhat in their primary stage, their distribution, the depth of the ulcerative process, and the character of the crusts.

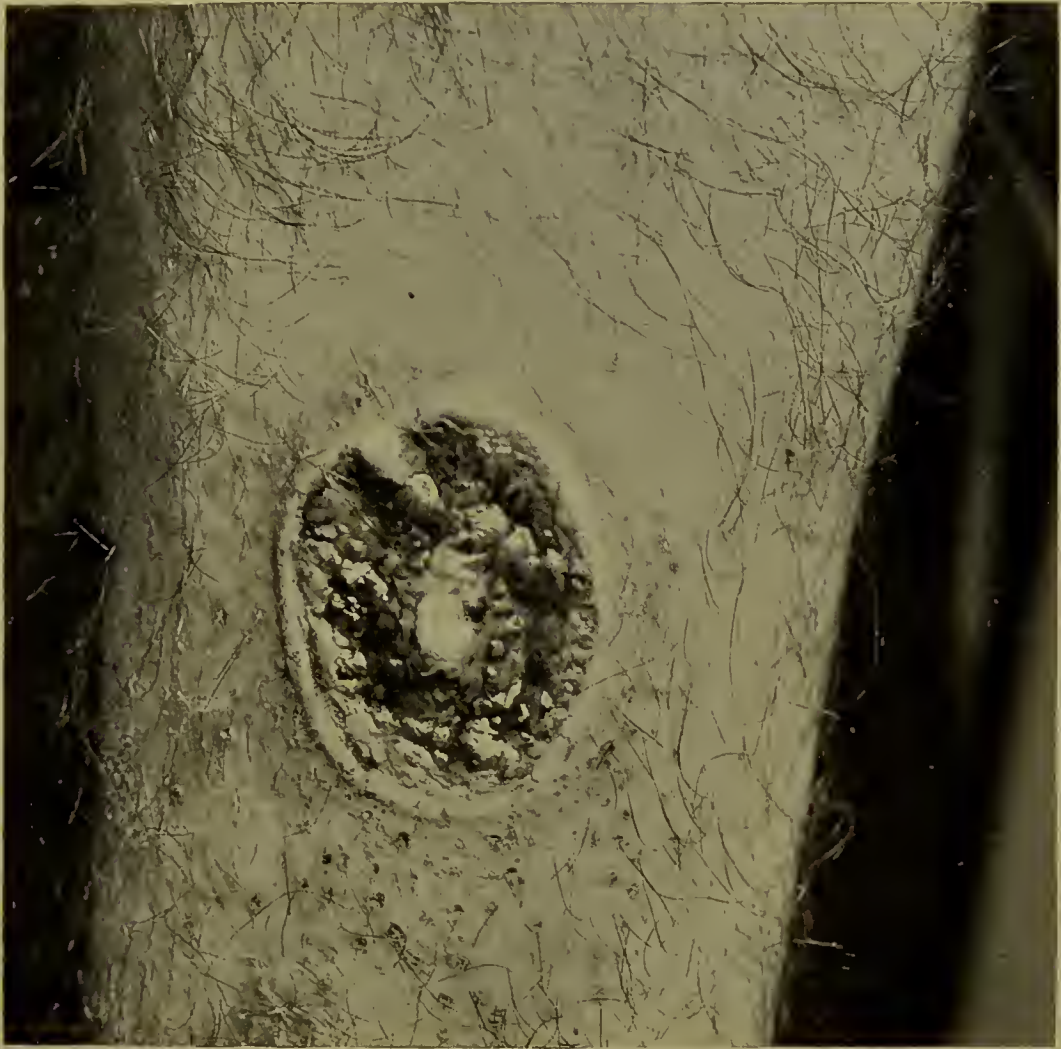


FIG. 8.—Ecthymatous ulcer of leg.

Impetigo rodens originates from a small pustule or a number of small pustules massed together; it has a preference for the face and hairy scalp. Lesions of impetigo rodens upon the scalp are represented in Fig. 7.

Deep ecthyma has for its elementary lesion a large pustule; its deep, destructive tendency constitutes its distinguishing characteristic; it is found chiefly on the lower extremities, though not limited to these regions. In Fig. 8 is shown a deep ecthymatous ulcer of the leg, from which the

crust has been removed. In the center cicatrization has begun, while the ulcerative process continues to extend at the periphery.

Rupia originates from a flat, sero-purulent bulla, or a pustule surrounded by a serous exudation. The basic infiltration is not so elevated or pronounced as in ecthyma; the ulceration is more superficial, its secretion is more often mixed with blood, imparting a greenish-black color to the crusts, which are distinctly laminated and conoid in shape.

Rupia has a more extensive distribution than ecthyma, often presenting the generalized character of an exanthem. It is more rarely found as a concomitant of other eruptive forms, while it is not unusual to see an eruption distinctly papular upon the trunk and upper extremities associated with ecthymatous lesions of the lower extremities.

Finally, it may be said that this group of pustulo-ulcerous lesions occur at about the same stage of the disease, and have the same clinical significance; they always indicate a bad type of syphilis. They may be regarded as accidents of the intermediate period which marks the transition from the secondary to the tertiary stage. By many authorities the *resolutive pustular syphilides* are regarded as secondary accidents, while the *ulcerative pustular syphilides* are classed as tertiary phenomena. The latter have certain characteristics in common with tertiary lesions; they are circumscribed, nonsymmetrical, and destructive, always leaving permanent scars. On the other hand, their generating elements, or the primitive lesions from which they originate, are of a superficial character.

THE TUBERCULAR SYPHILIDE.

In the classification of the syphilides based upon the anatomical form and character of the syphilitic process, the tubercle and gumma are recognized as the essential lesions of the tertiary stage. They constitute the latest and deepest of the cutaneous lesions of syphilis.

Between the tubercle and gumma there are numerous and striking analogies; they possess identical histological characters, differing only in the size and depth of the cellular infiltration, the chief distinction being that the tubercle is an intradermic lesion, while the gumma extends into the subcutaneous tissues. The tubercle may be described as a gumma of the skin, and conversely, the gumma as a deep tubercle of the connective tissue.

As a rule they develop from three to four years after the chancre, sometimes not before the tenth, fifteenth, or twentieth year after infection. Exceptionally they may occur much earlier, during the first year, or even within the first few months. Their precocious development always marks a grave or anomalous type of syphilis.

While they may develop upon any portion of the body or mucous surfaces, they are usually limited in number, with a predilection for the



DISSEMINATE TUBERCULAR SYPHILIDE.

face, back of shoulders, arms, thighs, and legs. They are essentially chronic in their course, and may disappear either by resorption or by a process of softening and ulceration.

The Tubercular Syphilide.—The tubercle may be defined as a circumscribed solid infiltration of the skin, which does not extend into the subcutaneous tissue. The lesions consist of small, rounded tumors, of a brownish-red or coppery color, varying in size from a small pea to that of a bean, firm and dense to the feel. As they grow older they become paler in color. Upon the lower extremities the nodules assume a violaceous hue. The lesions may be generalized, as in Plate XIII, or they may be isolated or occur in groups (Plate XIV), and form by their confluence large masses of infiltration, although the component tubercles are discernible especially on the borders of the patch. The eruptive elements may be grouped in the form of a ring, a horseshoe, or in concentric circles, and as they disappear by resolution or suppuration new lesions may spring up at the periphery, resulting in variously sized and shaped configurations.

Clinically the tubercular syphilide presents so many analogies with the late papular syphilide that it is sometimes difficult to draw clear lines of demarcation between them. This is not surprising, in view of their close histological relationship. The papular syphilide is essentially resolute; while the tendency of the tubercular deposit is to break down and become ulcerative, although, like the papule, it may disappear by interstitial absorption.

The tubercular syphilide may appear upon any portion of the integument. Its seat of predilection is the face, especially about the alæ of the nose, the forehead, the ears, the back of the neck and shoulders, and the inferior extremities; about the nose and neighboring parts the lesions have a special tendency to become aggregated. When developed upon the brow and along the hairy scalp they constitute one of the varieties of the so-called *corona veneris*.

The course of the tubercular syphilide is essentially chronic. The individual lesions are persistent and the retrogressive changes excessively slow; so that, with the development of new tubercles and the sluggish involution of the old ones, its duration may be prolonged for months or years.

The lesions of the tubercular syphilide may be divided into two distinct categories, the dry and the ulcerative, according to the changes which they undergo in the process of involution. In the former, resorption occurs without ulceration; in the latter, the cellular elements break down and are eliminated by the ulcerative process. In both there is more or less destruction of the connective tissue of the derma into which the embryonic cells have infiltrated, with the formation of cicatricial tissue.

The Dry or Atrophic Tubercular Syphilide.—This variety presents many analogies with the large papular syphilide. It occurs comparatively early, from the third to the sixth year, and the lesions may be disseminated and comparatively numerous; their number is often in inverse proportion to their size. In the later periods the tubercles are fewer in number, more voluminous, and more apt to occur in groups.

The face is a favorite location for this form of syphilide, the tubercles being numerous and prominent especially over the forehead, and forming by their confluence a diffuse nodular infiltration which, with the accompanying thickness of the skin, gives rise to the peculiar appearance which has been characterized as syphilitic *leontiasis*. In some cases the integument becomes enormously hypertrophied, separated by transverse folds or rugæ, forming prominent bosses, and presenting an appearance strikingly suggestive of leprosy.

In the majority of cases the eruption is circumscribed, and grouped with a circular or crescentic configuration which extends by the development of new tubercles at the periphery.

Upon the palmar and plantar surfaces they have a tendency to slight scaliness, constituting one of the varieties of palmar or plantar psoriasis. In this locality they are circularly disposed, with a scalloped configuration of the outer borders, surrounded by a coppery areola; the outlying tubercles, which form the periphery, are easily distinguishable.

In this variety the lesions undergo resolution through degeneration of the cellular elements, with atrophy of the dermal tissue—the cicatricial transformation taking place beneath an intact or simply inflamed skin, without the intervention of the ulcerative process. In the course of their involution the rounded nodules become flattened, less firm to the feel, and are finally effaced. The brownish-red coloration of the skin gradually pales into a grayish pigmented spot, which finally fades into a whitish cicatricial depression. When a group of tubercles undergoes the retrograde metamorphosis the older nodules first disappear, resulting in a cicatricial center, which gradually enlarges by the involution of the more recent tubercles developed in the periphery of the patch, the eruption often migrating over considerable surfaces. In this manner are produced the circular and variously shaped cicatrices characteristic of this syphilide.

The Ulcerative Tubercular Syphilide.—Softening, ulceration, and the formation of scabs or crusts, constitute the distinctive features of this variety. In the formative stage the ulcerative lesions do not differ essentially from resolute tubercles in their objective characters. The cardinal distinction is found in their terminal stage. Instead of disappearing by a process of interstitial absorption, the tubercle softens in the center, the epidermal covering becomes thinned, breaks down, and there results an open

PLATE XIV.



GROUPED TUBERCULAR SYPHILIDE (Fox).

ulcer, discharging a grayish-yellow, gummylike matter, which is apt to con-
crete into a grayish or greenish-black crust. The ulcerations are usually
deep and abrupt, with inflamed, thickened, and hypertrophied borders.
The ulceration varies in area and depth, and in the mode and rapidity
of its extension; it may be phagedenic, perforating, or serpiginous in
character.

The more or less grave significance of tuberculo-ulcerous lesions de-
pends upon their location and the character of the inflammatory compli-
cations which occur in their course.

By far the most common localization of the tuberculo-ulcerous syphi-
lide is the region of the face. Next in point of frequency is the scapular
region, the neck, the legs, arms, and trunk. Upon the extremities they
seem to have a preference for the bend of the elbows, the back of the
hands, and the knees. Upon the face the lesions are often associated
with swelling and hypertrophy of the tissues, producing an elephantiasic
condition. The ulcerations
are usually progressive, either
by the enlargement of the
ulcers or the development of
new lesions in their neigh-
borhood, which become con-
fluent, assuming a circinate
form (Fig. 9).

When situated upon the
nose this form of tubercular
syphilide often assumes a per-
forating character, penetrates
the alæ and nasal septum, or
the bony framework of the
nose, causing more or less
destruction of the parts and
consequent deformity. When
the inflammatory element
takes on a phagedenic or gan-
grenous character, the de-
struction of tissue is rapid



FIG. 9.—Tertiary ulceration of the nose. (Piffard).

and extensive. The entire nose, the lips, or portions of the cheek may
be swept away *en masse* within a few weeks.

By far the most common mode of extension of the morbid process is
by serpiginous ulceration upon any portion of the body, but most often
upon the face. An isolated tubercle appears, or a number of small tubercles
grouped around a large tubercle, in a stellate or circular form. The necro-
biotic process first attacks the older central tubercles; they become ulcerated

and covered with brownish seabs, under which they gradually heal, while the patch spreads at its margins by the development of new tubercles. By this slow peripheral extension, with coincident cicatrization of the center, the patches present so many analogies with the lupus that it has been improperly designated as *sypilitic lupus*.

The reparative process is marked by the falling of the crusts, revealing a reddish cicatrix more or less irregular, and often traversed by bridles or raised bands of connective tissue. The scars ultimately become



FIG. 10.—Ulcerated tubercular syphilide (Kaposi).

a, c, represents the mucous layer of Malpighii; from *h* to *c* the underlying papillae are preserved and distinctly marked from the mucous layer, the cells of which are increased in volume; some of them, provided with several nuclei, are mingled with a great number of small granular elements; *a, b, k*, is the abrupt border of an ulcerated gumma, formed by a thick granular layer, the elements of which differ from healthy wounds in process of repair, and in the midst of which is recognized the cellular infiltration of the gumma.

of a shining white color, and are more or less depressed according to the depth of the ulcerative process. The tuberculo-ulcerous syphilide has a wide chronological limit. It may develop any time, from the third to the fifteenth or twentieth year, or it may occur much earlier, as a manifestation of precocious syphilis. The statistics of Jullien show that fully

one fourth of all tertiary manifestations may be grouped under this syphilide. According to the same author, the date of its development is materially retarded by the prompt institution of mercurial treatment.

ANATOMY.—The minute anatomical structure of the ulcerative tubercle is thus given by Kaposi: The histological characters of the syphilitic papule differ in no essential respect from those of the larger tubercle except in the greater extent and depth of the cellular infiltration. Otherwise it is the same perishable elements which constitute the infiltration, and show in the older (central) portion at the earliest period the granular opacity, an almost “dusty” appearance, while those at the periphery still permit the recognition of a nucleus which takes a distinct carmine stain, and of a normally granular protoplasm. Over the peripheral parts of the tubercle (*h c*) the papillæ are well preserved, distinctly marked from the mucous layer, the cells of the latter, besides, largely interspersed with small granular elements, or themselves enlarged, provided with several nuclei.

As the older atrophic portions are approached, and on the latter the demarcation between the rete and papillæ becomes indistinct, the penetration of the foreign element continues from the papillæ into the former; the rete then becomes narrower, and finally is altogether absent, when the cell-infiltrated corium is laid bare—beginning of the *ulceration*. Up to this point the appearance does not differ from that of a superficially exulcerated papule or the initial sclerosis.

As the ulceration progresses there occurs a loss of substance, which varies in depth, but which even in microscopic sections reproduces the naked-eye appearance (*a b*), and with reference to its possible depth and width in general is determined by the cellular infiltration. In the case of the gummous tubercle this must of course extend into the subcutaneous cellular tissue, may closely surround and fill all the included structures, glands, and follicles, crowd in between the fat-lobules, as seen at *f* enveloping the vessels, and, though pretty sharply demarcated peripherally (*d, e*), may also reach along the vessels variable distances beyond the infiltrated focus.

The abrupt, slightly undermined border, which is raised above the level (*a b*), as well as the further limiting wall (*b k*), are formed by a variably thick layer of a granular, crumbly mass, whose elements differ from the pus-cells of healthy granulating wounds, and behind which the cellular infiltration of the gummous node is recognizable.

This layer is the expression of the advancing necrobiosis of the specifically infiltrated tissue, and gives to the surface of the ulcer the well-known “lardaceous,” “unclean,” macroscopic appearance.

Diagnosis.—The tubercular syphilide may be mistaken for the *large papular syphilide*. As before indicated, the tubercle is intermediate pathologically between the papule and the gumma, the difference being one of degree, according to the depth, density, and volume of the infiltration. From their objective characters alone it is not always possible to distinguish the dermo-papillary infiltration represented by the papule from the slightly deeper and more solid infiltration of the tubercle. The papular syphilide is to be distinguished by its earlier appearance, its more general distribution, and its more rapid course. The papules in the course of

their involution become flattened and scaly, often desquamating a number of times in succession. The lesions of the tubercular syphilide are isolated or grouped in patches; they rarely become eroded or scaly, but preserve their globular outline until resolution takes place; they leave indelible cicatrices.

There are a number of nonspecific skin diseases with which the tubercular syphilide may be confounded, the differentiation being particularly difficult when situated upon the hands and face.

The dry tubercular syphilide of the palms constitutes one of the varieties of the so-called *palmar psoriasis*; but true psoriasis of the palms or soles is so exceedingly rare that it may be eliminated from consideration.

In this region this syphilide bears a most deceptive resemblance to *chronic eczema*. Palmar eczema is, however, more apt to be characterized by scaling, fissuring, and serous exudation, attended with itching, and its outline is not so distinctly demarcated. In syphilis the infiltrated border is composed of small confluent tubercles, scalloped in outline and surrounded by a coppery areola.

Acne rosacea tuberosa may be mistaken for the tubercular syphilide. In syphilis the tubercles are smooth, glossy, and firm to the feel, and distinctly demarcated in their outlines. In acne the nodules are uneven, situated upon reddened and hypertrophied skin; dilated and tortuous capillaries are commonly present. The lesions of acne never undergo the degenerative and destructive changes which characterize syphilis in this region.

Parasitic sycosis may be mistaken for a tubercular syphilide, involving the hairy regions of the face. Sycosis directly involves the hair-follicles; the hairs are loosened and broken by parasitic infiltration and readily fall. The lesions are of a more intense, vivid red, less coppery in color; they readily suppurate; they are accompanied with a peculiar brawniness of the integument; they are limited to the beard, while syphilitic tubercles appear upon the nonhairy parts.

Rhino-scleroma is so exceedingly rare, in this country at least, that it may be practically eliminated; like syphilis, it is characterized by its tendency to destroy the soft parts and run a protracted course. The history of trauma of the nose preceding the development of the neoplasm, and the absence of concomitant signs of syphilis, will usually serve to exclude the latter.

Lupus vulgaris is of all nonspecific skin diseases the affection most likely to be confounded with the tubercular syphilide, especially when the latter is localized in regions for which lupus shows a predilection. There is not only a resemblance in the form, configuration, and other objective characters of the lesions, but numerous analogies in its course, and the peculiar types assumed by the morbid process. The nodules of

lupus, like those of the dry or atrophic tubercular syphilide, may undergo interstitial atrophy and disappear without open ulceration; also, like the lesions of the ulcerative variety, the lupus nodules may soften, break down, and result in the formation of open or scabbed ulcers. The most characteristic resemblance is found in their peripheral enlargement by the development of new lesions, and their tendency to a serpiginous mode of advance. The lupus process is, however, much slower in evolution, its sluggish development and progress as compared with syphilis constituting a cardinal point of distinction. Lupus vulgaris generally appears in early life before puberty, while acquired syphilis is essentially a disease of adult life.

The tubercles of lupus are pinkish, translucent, of an apple-jelly color, more irregular in outline, and the surrounding integument is often studded with minute colloid masses resembling milia. They are surrounded by an inflammatory zone which gradually fades into the normal skin, in contradistinction to the sharply defined, coppery areola of syphilitic nodules. The ulcers of lupus are of an irregular shape, not so sharply cut, the edges are softer and easily bleed, indolent, and painless. Syphilitic ulcers are rounder, deeper, undermined, the edges indurated, frequently painful on pressure. The secretions of lupus ulcers is less abundant, and the crusts are less bulky and do not present the greenish-black color characteristic of syphilis. The process of cicatrization is slower in lupus, and the scars are thick, dense, puckered or radiating, not so smooth and depressed as in syphilis.

Notwithstanding these points of differentiation, it is often difficult to decide whether we have to deal with a lupus vulgaris or a tubercular syphilide, especially when situated in the region of the nose; both may occasion considerable destruction of tissue and consequent deformity. In lupus the ulcerative process always proceeds from the surface to the deeper structures; it may destroy the cartilaginous septum, but does not attack the bony part of the nose. When the alæ and tip of the nose are destroyed these parts present the appearance as if they had been nibbled or gnawed away, and the organ is sharpened as well as shortened. Syphilitic ulceration more often begins in the bony structures, and involves the superficial parts secondarily; the organ may be destroyed in its totality; an offensive symptom, known as syphilitic ozena, is commonly present.

Epitheliomatous ulcers of the nose and face may be mistaken for the tuberculo-ulcerous syphilide. The hard, everted border of epithelioma, the granulating fungous character of the base, its limitation as a rule to a single isolated lesion, its sluggish course, the glandular enlargements and accompanying cachexia, and the fact that it is confined almost exclusively to the aged, will serve for purposes of differentiation.

The tubercular syphilide bears a most deceptive resemblance to *leprosy*, especially when the lesions are hypertrophied and situated upon the brow and lobes of the ears. The leontiasis of leprosy is more pronounced than that of syphilis. The enormous nodular masses, the deep, supra-orbital furrows, the pillowy protuberances of the cheeks, with loss of the eyebrows and lashes, are not observed in syphilis.

The leprous neoplasms are softer to the feel, larger in volume, more protuberant, and crowded upon an infiltrated base with œdema of the skin and ganglionic enlargements. Their seats of predilection are the facial mask, ears, back of hands, and forearms. The nodules of syphilis are more globular in outline, more apt to be grouped and more rapid in involution. Anæsthesia is often present in the center of a patch of leprous tubercles or its immediate neighborhood, but absent in syphilis.

The anæsthetic form of leprosy would hardly be mistaken for syphilis. Still, it is well to bear in mind that the loss of the extremities, fingers, toes, and feet, may result from syphilis. Mutilations from this cause are, however, quite exceptional.

The Gummatous Syphilide.—When the syphilitic cell infiltration takes place in the subcutaneous cellular tissue the nodular mass thus formed is termed a gumma. This term was formerly restricted exclusively to the products of syphilis, but more recently it has been applied to the somewhat analogous formations of serofuloderma.

The gumma consists essentially of a nodular or solid tumor more or less distinctly circumscribed by the condensation of the connective tissue at its periphery, forming a limiting membrane. The neoplasm is deeply seated in the subcutaneous or submucous tissues, often involving the muscles, periosteum, and bones. The skin at first freely glides over the tumor and is involved only secondarily and by ulceration after preliminary softening and breaking down of the neoplastic elements. Exceptionally resorption may take place and the tumor disappear without the intervention of the ulcerative process.

The color and consistence vary according to the stage of their development. When recent, the integument is of a reddish or coppery color, which deepens into a brownish red or livid tint as they grow older. They are dense and firm to the feel, but as the ulcerative process sets in they become soft and doughy, with evidences of fluctuation.

Gummata vary also in form, volume, multiplicity, and the date of their development. They are usually globular or oval, sometimes irregularly flattened, the external form being determined by the anatomical relations of the tissues in which they are implanted. Where the cellular tissue is loose and abundant they are usually globular or spherical; they are elongated or acorn-shaped along the fingers, flattened upon the cranium.

In volume they vary from that of a pea or cherry to that of an egg or an orange; they are usually described as nut-sized tumors. In a case of Fournier's a single tumor measured fourteen centimetres in length, eight to ten in breadth, with a thickness varying from two to six centimetres. When deeply seated, or when the infiltration is diffuse, they may cause no marked projection above the surface. Their number is usually quite limited, from one to a half dozen or more; exceptionally they may be quite numerous, as in the case reported by Lisfrane, in which one hundred and sixty were counted upon the arms and legs of a patient. As a rule there is a certain ratio between their size and multiplicity; the more numerous, the smaller they are, with a greater tendency to disappear by resolution.

As regards the date of their occurrence, gummata rarely develop before the third or fourth year of syphilis, sometimes not until the twentieth, thirtieth, or fortieth year. They may continue to recur in a succession of crops during a long series of years, or they may represent the awakening into activity of the syphilitic diathesis after it has remained dormant for years. On the other hand, they may appear as precocious accidents in malignant syphilis within the first few months after infection. Mauriac has reported cases in which large nodular neoplasms with, as the typical characters of gummata, which softened and were converted into deep, cavernous ulcers, developed within a few months after the appearance of the chancre. The same author has described, under the title of *érythème nouveau syphilitique*, certain dermic and hypodermic nodules which appear comparatively early in syphilis, sometimes as early as the fourth month, and which are essentially resolute. The tumors, which are habitually seated upon the legs and forearms, more rarely disseminated over the trunk, consist of ovoid or irregular protuberances, from the size of a nut to that of an egg. The nodules may be free and perfectly mobile in the subcutaneous cellular tissue, or the inflammatory condition may be so intense as to cause an œdematous infiltration which renders the neoplasms adherent with the superimposed derma. Their color is of a rosy red at the periphery, and of a somber red, deepening to an ecchymotic tint in the center, and does not completely disappear upon pressure. The ecchymotic tint generally pales and turns yellow in the course of their involution, which is invariably by resolution. Their entire duration rarely exceeds thirty or forty days. Not infrequently relapses take place after a short period. They are attended with rheumatoid pains, characterized by nocturnal exacerbatons.

Gummous neoplasms are usually isolated, sometimes confluent, forming veritable tumors of large dimensions. A tendency to symmetry has been noticed in particular locations, as about the ankles. They are characterized by an exceeding slowness of evolution; they are essentially

apathetic, indolent, and insensitive; they may be painful in certain regions, as upon the cranium, or from the accident of pressure upon a cutaneous nerve. They are rarely attended with marked constitutional disturbance.

In the ordinary evolution of the gumma three principal stages may be distinguished: the formative, the ulcerative, and the reparative.

In the *formative stage* the tumor grows gradually until it attains its full development, appearing as a rounded hypodermic nodule of firm consistence, readily movable, and over which the skin freely glides. In this condition it may remain without perceptible change for weeks and months.

The *stage of ulceration* is marked by evidences of softening of the center of the tumor, which loses its firm consistence and gives a deceptive indication of the presence of pus; coincident with this central softening, the overlying integument appears inflamed, reddened, and thin, and finally becomes perforated at its most prominent point. Through this opening the liquefied disintegrated products, consisting of a thick, viscid, gummylike material, exude. The sphacelated connective tissue, resembling the core of a furuncle, still remains attached to its subcutaneous connections, and is gradually eliminated. If the gumma be very voluminous, there may be a number of openings at different points of the surface.

The gummatus ulcer thus left is a circumscribed, more or less deep, circular excavation, with thickened and adherent borders, the walls undermined, the floor uneven, covered with broken-down tissue, which is gradually detached and thrown off with the sero-purulent secretion from the walls of the cavity, in the form of a slough or shreds and filaments. Two or more contiguous ulcers may unite, the resulting lesion presenting a bicyclic contour. Not infrequently a number of gummata are disposed in a group, each of them opening by a single orifice; as they enlarge by ulceration the intervening tissues are swept away, and the cavities unite, forming a vast excavated ulcer.

When the broken-down and necrosed tissue is completely eliminated the *reparative process* begins by the clearing up of the floor of the ulcer, which becomes covered with healthy granulations; the thickened borders are effaced, and the cavity is more or less completely filled up by cicatricial tissue. The resulting cicatrix is usually circular, smooth, white in the center and brown at the periphery, its size, contour, and depression bearing a definite relation to the area and depth of the destructive process; it is frequently immobile and adherent to the parts beneath, especially when situated over a bony surface.

The course and general characters of gummatus ulcers are modified according to their location and the intercurrent of certain morbid processes—inflammation, gangrene, phagedenism, etc. While gummata may

develop upon any portion of the cutaneous surface, their seat of predilection is upon the lower extremities, the upper and middle third of the leg, and about the ankles; next, perhaps, in point of frequency, is the face, especially the forehead and scalp; the palms and soles enjoy an almost absolute exemption.

The predilection of gummata for the legs is doubtless determined by certain dystrophic conditions here present, as varicose veins, the contusions and various traumatism to which these parts are subject. In



FIG. 11.—Subcutaneous gumma (Basset).

The central caseous part *a* is constituted by elements in process of degeneration, cellules with nuclei staining poorly, infiltrations of fatty and pigmentary droplets, disaggregated globules, elastic fibers disintegrated, colloid granulations. Entirely surrounding it is proliferated tissue, *b*, in certain points, *d*, becoming sclerosed; many round cells with nucleus distinctly colored by carmine mingled with connective fibers here and there; *c*, the condensed tissue forms a distinct border (Malassez). One may also see, but more rarely, some giant cells.

this location we find that they exhibit a greater rapidity of development, are more frequently the seat of inflammatory complications, and more quickly break down and form open cavities (Plate XV). They are apt to be attended with marked cedematous infiltration, causing an increase in the size of the limb; the integument becomes hard, brawny, and often thrown into folds about the ankles, sometimes presenting an elephantiasic condition. Gummatous ulcers of the legs, when complicated with phage-

denism, may destroy the aponeurosis of the leg, or may penetrate more deeply, destroying all the subjacent tissues, and laying bare the bones.

Gummatous ulcers of the face are often followed by deforming cicatrices, salivary fistulae, ectropia, etc.; upon the forehead they may destroy the external table of the frontal bone, and involve the frontal sinuses. Gummata of the nose, the ocular and auditory apparatus, are considered in other sections of this work. Upon the hairy scalp gummatous ulceration is often profound and destructive; the external table or the entire thickness of the skull may be perforated, exposing the dura mater.

In the groins, about the genital and perigenital parts, gummatous ulcerations may cause deep and extensive destruction of important organs, erosion of important vessels, with dangerous and even fatal hæmorrhage. The mutilations and contracting cicatrices of the penile organs may lead to impotence. Upon the abdomen they are fortunately rare, since in this location they are apt to form vast serpiginous ulcerations, which involve the entire thickness of the abdominal walls.

The objective characters and course of gummatous ulcers are also modified in a marked degree by certain pathological coincidences. The influence of diathetic conditions, as scrofula, etc., has already been referred to as impressing a peculiar morbid type upon the syphilitic process. Syphilitic ulcers occurring in scrofulous individuals are apt to be indolent and persistent, and assume a scrofulous aspect, which suggests a morbid hybridity.

Similarly we find that a syphilitic ulcer may become covered with granular masses or papillary new growths which give it a deceptive resemblance to epithelioma, and has led to its improper designation as cancer-syphilis or syphilo-cancer. While the possibility of a combination of the syphilitic and cancerous process, or a transformation of one into the other, can not be admitted, yet clinical observation shows that the tissue damage effected by syphilis predisposes to the development of cancer, by constituting a *locus minoris resistentiæ*. Examples of cancer occurring in cicatrices left by syphilitic ulcers, or even in the ulcers themselves, are numerous and well authenticated.

ANATOMY.—The histological characters of the gumma do not differ essentially from those already given in connection with the anatomy of the tubercle. According to Kaposi, the conditions are somewhat different in the subcutaneous gummous tubercle, but only in so far as the manner and progress of the metamorphosis are determined by their deeper seat and their greater bulk. "I can not agree with some authors who maintain that the peripheral part of the gumma changes into fibrous connective tissues, into a cicatrix, while the inner portion becomes limited as a spherical tubercle which alone is said to undergo the retrograde metamorphosis into mucous softening, fatty degeneration, or cheesy thickening. The whole of the gumma, like the smallest syphi-



GUMMATOUS ULCERATION OF LEG (Piffard).

litic nodule, undergoes retrogression, atrophy, suppuration, or liquefaction, and never changes into permanent connective-tissue formation."

Diagnosis.—The diagnosis of the earlier manifestations of syphilis is usually aided by the history of a chancre and the presence of concomitant specific lesions; the gumma, however, which develops at an advanced age of the diathesis, ordinarily stands alone as the sole morbid expression, and the patient rarely associates it with an unfortunate experience of many years ago, which he may have forgotten. In most cases it is necessary to rely solely upon the objective characters of the lesion. A gummy tumor is so typical in its mode of evolution that a mistake could scarcely be made if the various stages of its progressive metamorphosis came under the physician's observation. Unfortunately, however, this process is ordinarily too slow and chronic to afford the opportunity. In either stage the gumma may be mistaken for certain nonspecific lesions: in the stage of tumefaction it may simulate various solid tumors, as sarcoma, lipoma, fibroma, or an enlarged ganglion; in the stage of softening it presents certain analogies with an ordinary abscess, a furuncle, suppurating gland, etc.; in the final stage it may bear a deceptive resemblance to chancreoid, epithelioma, lupus, and various ulcerative lesions.

Lipoma may be differentiated from a gumma by its more flattened, diffuse, and less globular form, its softer consistence, greater compressibility, and its absence from the regions of preference for gummata.

Sarcomatous tumors are more generally distributed, with a predilection for the trunk; the overlying skin is changed in color, bluish or purplish, and they do not disappear by resorption.

Scrofulous gummata, which present close structural and clinical analogies with syphilitic gummata, are ranged always along the course of the lymphatics in a manner quite characteristic; they are more indolent, painless, and persistent.

The *ulcus cruris* from varicose veins may be mistaken for a syphilitic ulcer. The constant presence of varicose veins, the frequent concomitance of eczematous infiltration and hypertrophy of the skin, the pronounced pigmentation from long-continued congestion, and their more frequent localization on the lower third of the legs, are diagnostic points. Syphilitic ulcers occur commonly in the middle and upper third of the leg; their borders are apt to be festooned from the confluence of contiguous lesions, and the surrounding skin is normal.

An ulcerated gumma of the genitals often presents a most deceptive resemblance to the *initial lesion*, but the ulceration is deeper, more perforating in character, and the edges are undermined rather than sloping. It may also be mistaken for *chancreoid*.

Epithelioma is frequently confounded with an ulcerated gumma, especially when situated upon the tongue or genitals. Epithelioma is char-

acterized by its development from a warty base and its slow development, often remaining stationary for a long period before the ulcerative process sets in. There are always evidences of new growth in its hard, everted border, which is not pigmented. When it breaks down it shows an irregular, firm, granular base, with warty or papillary excrecences. While syphilitic ulcers are commonly multiple, a carcinomatous ulcer is single, its secretion is scanty and offensive, and does not conerete into crusts; the ulceration always begins externally and extends into the deeper parts, and its superficial area is large in proportion to its depth. Pain of a lancinating character is a common symptom. Implication of the neighboring lymphatic ganglia and evidences of the cancerous cachexia are important but by no means constant diagnostic signs. Epithelioma is usually a condition of advanced life, while gummatus ulcers may occur at any age. Histological examination will oftentimes throw an important light on a doubtful case; this may, however, be inconclusive, and the most valuable means of differentiation that we possess is specific treatment. Under the active use of the iodide of potassium, alone or combined with local mercurialization, the features of a syphilitic ulcer show unmistakable changes within a week or ten days. It may be laid down as a safe and judicious rule, in the case of all lesions of a possibly syphilitic nature, to employ a preliminary specific treatment before resorting to surgical interference. Especially is this true of doubtful lesions occurring upon the face, the breast, or the genitals.

In cases of tumors or ulcerations of ambiguous identity Jullien highly extols the superior value of the hypodermatic injection of calomel as a test medicine, and this, irrespective of the duration of the neoplasm or the age of the diathesis. He declares that a therapeutic diagnosis of syphilis may be clearly defined in eight days by calomel injections.

THE SERPIGINOUS SYPHILIDE.

The tendency to spread at the periphery while healing in the center is a characteristic of all syphilitic infiltrations. We have seen that many circinate lesions of the papular type are formed by the development of new papules at the margins of a patch, while resolution takes place in the center. In the lesions of the tertiary stage, however, this tendency to invade adjacent tissues by spreading at the edges is a much more marked and important feature.

The term "serpiginous syphilide" is applied to lesions whose mode of advance is by ulceration at the periphery, with coincident cicatrization of the center. The ambulant, creeping character of the ulcerative process is independent of the histological characters of the generative lesion, as it may originate in a pustule, a tubercle, or a gumma. The peculiarity in its mode of extension would seem to depend upon a local infective



SUPERFICIAL SERPIGINOUS SYPHILIDE.

process. The serpiginous mode of extension is by no means confined to syphilitic lesions, but may be manifest in nonspecific affections, as chancreoid, lupus, etc.

According to the depth of its destructive action, two varieties of the serpiginous syphilide are recognized—the superficial and the deep.

The *superficial serpiginous syphilide* commonly originates from a single pustule or tubercle, or a number of contiguous lesions which run together, forming a round or oval patch, superficially ulcerated and covered with crusts. Its mode of extension is as follows: As the healing process takes place, the crusts fall off in the central portion, leaving a ring of encircling crusts at the periphery; coincident with the central cicatrization the ulcerative process advances, forming a ring or furrow of ulceration at the periphery, which in turn becomes covered with a greenish-black rim of crusts formed by the rapidly concrescible purulent secretion. The lesion presents thus a pigmented cicatricial center, surrounded by a rim of crusts half an inch to an inch in diameter, covering an ulcerated furrow, beyond which extends a coppery-red infiltrated areola. This process may continue for months or years, the peripheral evolution keeping pace with the central insolution, and we thus have a continually widening circle or ulceration inclosing a constantly increasing area of scar tissue. Plate XVI represents a superficial serpiginous syphilide, more or less generalized, in which the reparative process has been completed.

Instead of this strictly centrifugal mode of extension forming round or oval patches, one segment of the circle may entirely heal while the ulcerative process advances at the other portion of the circumferential border, producing crescentic, reniform, or horseshoe-shaped patches. In this manner the migratory ulceration may sweep over large surfaces, its direction in one way or the other being determined by the peculiarities of the tissues. When situated upon the limbs it rather tends in the direction of their long axis than to their complete encirclement, forming elongated oval patches. Upon the face and trunk the ulceration is more apt to maintain a distinctly circular contour. The course of the serpiginous syphilide is essentially chronic; its duration is always protracted, unless terminated by the intervention of active specific treatment.

The *deep, serpiginous syphilide* differs from the preceding in the deeper-seated character of the lesions, which serve as the focus of ulceration, and the greater depth of the destructive process. Plate XVII represents a deep serpiginous syphilide seen in process of extension on the arm and face. It more commonly originates in lesions of the tubercular or gummatous type, and its chronological position is at a more advanced stage of the diathesis. It may develop from a single tubercle or from a number of nodules circularly grouped. The older central nodules first

undergo disintegration, ulcerate, and become surmounted by a crust, underneath which cicatrization takes place. The outlying nodules in turn break down, forming a deep fossa of ulceration, which is soon covered with a ring of greenish or blackish crusts. The process is perpetuated by the evolution of new nodules at the periphery, forming a solid wall of infiltration, which in turn becomes plowed up by an ulcerative furrow half an inch or more in width, and sharply cut, as if it had been dug out by a gouge. The outer border of the ulceration is always steep or undermined, and deeper, while the inner margin is more shallow, and sloping gradually. The crust is likewise thicker and more prominent at the outer edge.

In some cases the ulcerative process is so rapid and profound as to approach the character of phagedena, and has led to its designation as *phagedinisme serpigineux*. It attacks the deep, subcutaneous cellular tissue and the underlying structures in the form of vast excavated ulcers, which are most formidable in their profound and destructive effects.

Diagnosis.—The development and mode of extension of the ulcerative process are so typical and distinctive that the serpiginous syphilide can hardly be confounded with any other disease, except perhaps lupus, and that form of phagedenic chancroid in which the ulcerative process pursues a sinuous or serpentine course.

Lupus serpiginosus is essentially a disease of early life, and is commonly confined to the face and extremities. The differential characters of lupus and syphilitic ulcerations have already been referred to. Instead of the solid wall of infiltration, surrounded by a well-defined coppery areola, the boundary line of serpiginous lupus is not continuous, but is broken up into fragments of circles, separated from each other by cicatrized surfaces. The ulcerous band which marks the extension of the destructive process is shallower, narrower, more ribbonlike; the crusts which cover it are thinner and more adherent. The entire process is more superficial than in syphilis. The cicatrices of serpiginous lupus are not so smooth as those of syphilis; they are uneven, and traversed by interlacing bands of connective tissue which give them the aspect of scars produced by burns.

The serpiginous syphilide is ambulant in character, creeping over large surfaces, while lupus is more limited and localized.

Serpiginous chancroid is almost invariably found in the genital or perigenital region, and never occurs upon the face and other parts for which syphilis manifests a predilection. The ulcerative process is not preceded by neoplastic infiltration, but advances by undermining the skin and dissecting up the tissues; the secretion is less abundant, and does not form crusts.

PLATE XVII.



DEEP SERPIGINOUS SYPHILIDE (Allen).

THE VEGETATING SYPHILIDE.

Under the title of *syphilis cutanea papillomatosa seu vegetans* has been described a complication of syphilitic infiltrations determined by an exaggerated hypertrophy of the papillæ. The tendency of moist lesions of the papular type to assume a condylomatous character under the influence of various local causes of irritation has already been referred to in connection with the metamorphic phases of the flat condyloma. Unna has advanced the theory that the vegetating syphilide owes its origin to a moist seborrhœic eczema combined with syphilis.

Hypertrophy of the papillæ also occurs in connection with rupial or pustulo-ulcerous syphilides, and tuberculous or gunmatous infiltrations with an ulcerated base. That the papillomatous element is not essentially syphilitic, but is due to certain localizing influences in the skin, is evident from the fact that many nonspecific lesions—as scrofulous and lupoid ulcerations, phagedenic ulcers, pemphigus, sycosis, etc.—are subject to the same pathological process. The morphological characters of papillary proliferations of syphilitic origin differ in no essential particular from the papillomatous production which may follow any chronic inflammation of the skin. In both cases there is a hyperplasia of the papillæ, which become elongated and prominent, giving the vegetations a mammillated or verrucose aspect.

The papillary proliferations which appear upon tertiary ulcers often form large verrucose vegetating masses, which present a most deceptive resemblance to the papillomatous growths of the skin known as frambœsia, or yaws. The clinical resemblance of the vegetations of frambœsia to syphilis is so close and deceptive that for a long time the existence of the former as an independent disease was denied. Most authorities, however, now recognize it as a disease *sui generis*, and bearing no relation to syphilis.

The vegetating syphilide has a predilection for regions of the body provided with hairs, especially the scalp and bearded portion of the face, the axillary folds, the genital regions, and about the anus. It is also found along the nasojugal and nasolabial folds, the commissure of the lips often extending to the brow, cheeks, and chin. In these regions the vegetations appear as irregular rounded protuberances or tumors of variable size, of uneven elevation, and secreting a puriform fluid, which concretes into thin, yellowish crusts. The removal of the crusts reveals a red, rugous surface, made up of villous or fleshlike excrescences. Involution may occur by a process of ulceration, or the vegetations may become sphacelated and detached *en masse*.

Diagnosis.—Since the papillary proliferations which constitute the distinctive feature of the vegetating syphilide present the same mor-

phological characters with those occurring as a sequence of various other pathological states, the differential diagnosis is sometimes difficult.

Frambæsia presents numerous analogies with syphilis in its clinical features and mode of development. It begins with nodosities disseminated at first but afterward confluent, which become excoriated and humid, and covered with papillary exerescences. It is distinguished by the peculiar fungating character of the eruption, the acid reaction of its secretion, and the absence of certain pathological coincidences common to syphilis, as enlarged glands, alopecia, iritis, etc., and its failure to respond to mercurial treatment. *Frambæsia* is, moreover, a comparatively rare disease, and confined to tropical countries.

Pemphigus vegetans is another affection which presents such a marked objective resemblance to the vegetating syphilide that the earlier observers denied its distinct clinical entity and classed it as a manifestation of syphilis. The primary lesion of pemphigus is always a bulla which becomes exulcerated; upon the red, humid surface rapidly spring up papillary exerescences closely resembling condylomata lata. The patch extends by the development of new bullæ at the periphery, and by the confluence of contiguous patches are formed serpiginous lesions which advance over large surfaces. It is differentiated by the pronounced cachexia, which is present from the first or speedily supervenes, and almost invariably leads to a fatal termination from exhaustion or intercurrent disease.

Certain forms of *lupus* which undergo a hypertrophic evolution present the most deceptive resemblance to the vegetating syphilide. A variety of *lupus* described by myself as *tuberculosis papillomatosa cutis* (Jour. Cut. and Gen.-Urin. Diseases, October and November, 1888) was at first mistaken for syphilis. In this case the papillomatous proliferations developed without pre-existing ulceration; but it is chiefly the hypertrophic vegetating ulcerative forms, which are classed as *lupus hypertrophicus* and *lupus verrucosus*, that most closely simulate syphilis.

Lupus is distinguished by the slowness of its evolution, the irregularities of the ulceration, the livid, fungous character of the papillomatous granulations, the softness of its base and borders, and its limitation, as a rule, to the face and extremities. The hard, brownish-red infiltration of the margins, which is a pathognomonic feature of the vegetating syphilide, is absent in *lupus*.

THE PIGMENTARY SYPHILIDE.

Pigmentary changes constitute a characteristic and more or less constant feature of the retrogressive stage of all syphilitic lesions. These changes consist of an excess or loss of pigment.

An excess of pigmentation is seen in the dark brownish stains which persist for a long time after the involution of neoplastic infiltrations. They are due to the escape of the normal pigmentary matter of the blood into the Malpighian layer and its subsequent metamorphosis.

A loss of pigment often occurs as a retrogressive phase of the maculo-papular syphilide, in which whitish spots or disks occupy the seat of the lesions. Loss of pigment is the ultimate and invariable feature of the cicatricial metamorphosis of pustular and ulcerative lesions which have caused destruction of the skin. Associated with this loss of pigment there is also an accumulation in the form of an areola around the scars, often persisting for a long time.

Such pigmentary changes may be regarded as the posthumous expression of an anterior syphilitic infiltration; they possess no especial clinical value, since they are common to the lesions of other dermatoses.

The pigmentary syphilide occurs as an independent eruption; the hyperpigmentation, which constitutes its essential feature, represents a primary process and develops *d'emblée* without pre-existing infiltration. In the course of its evolution the pigmented patches become the seat of leucodermatous changes from absorption or displacement of the pigment, which disappears from the center and increases at the periphery. This unequal distribution of pigment in adjacent surfaces creates by contrast the illusion of achromia, while at the same time it heightens the perception of hyperchromia. When fully developed, the pigmentary syphilide presents the macroscopical aspect of islets of white skin surrounded by pigmented zones. The apparent decolorization of the spots has led many observers to regard this as the essential feature, and it has been classed under the designation of syphilitic leucoderma or *pseudo-leucodermie syphilitique*.

The leucodermic aspect, however, is largely an optical illusion, created by contrast with the hyperpigmented zone. That the decolorization is apparent rather than real is evident from the results of microscopical studies, which show that the white spots have the characters of normal skin. Tanturri and Saintin claimed to have demonstrated, in the specimens they examined, that the white spots in reality contained even more pigment than the normal skin, although much less than the macroscopically pigmented zone.

The pigmentary syphilide was first described by Hardy and his pupil Pilon, under the designation of *syphilide pigmentaire du col*, from its presumed limitation to this region. While its seat of predilection is the neck, especially on the sides, it may have a much more general distribution over the trunk and thighs; the face, forearms, and wrists, the legs and soles being exempt. In women it is usually limited to the neck,

while the generalized form is more common in men. It is seen oftener in brunettes than in blondes.

It is rather a rare condition, although not nearly of such infrequent occurrence as was formerly supposed, probably due to the fact that its connection with syphilis was not recognized. The chronological period of this syphilide is from the first few months to the second or third year, exceptionally much later.

The pigmentary syphilide presents different phases in its development and decline, the variation in its objective characters being due to modifications in the disposition and arrangement of the pigmentary proliferation, the confluence of contiguous lesions, etc. Fievey (Annales de Dermat. et de Syphilig., 1891) describes three forms of the pigmentary syphilide—the *marmoraceous*, the *spotted*, and the *retiform*. In its initial period there is a more or less uniform and diffuse pigmentation of the skin. As ordinarily seen in its period of development, the eruption consists of roundish or oval spots of variable size, from that of a lentil to that of a silver quarter, of a yellowish-brown or *café-au-lait* color, isolated or arranged in the form of a network. In the course of its evolution displacement of the pigment to the periphery takes place, and the roundish or oval spots become irregularly margined or dentated, inclosing islets of apparently abnormally white skin, simulating leucoderma.

The patches do not desquamate or become elevated, and the surface remains unaltered in structure, irrespective of its duration, which is quite variable—from three to six months, or even longer. Exceptionally it may persist for several years. It is but little influenced by specific treatment. Although the pigmentary syphilide possesses little clinical importance apart from its undoubted value for diagnostic purposes, there has been much discussion as to its nature and the pathogenic mode of its production.

Kaposi and many of his German *confrères* deny the specific autonomy of this syphilide, while other Continental authorities look upon it as always secondary to an abortive roseola, or some other form of superficial eruption.

Maieff, who has made an exhaustive study of the macroscopical and microscopical characters of this syphilide, gives (Premier Congrès International de Derm. et de Syph., Comptes Rendus, 1890) the following conclusions as to its mode of production: The pigmentary syphilide develops under the influence of a chronic specific inflammation of the small blood-vessels of the skin. It is possible that this vascular lesion may itself be consecutive to the general troubles of nutrition which is remarked during the evolution of the syphilides in the condylomatous period. At all events, this syphilide has an evolution peculiar to itself, for otherwise it would be more frequent. At its *début* it presents itself as an endothelial affection,

likewise as a cellular infiltration of the adventitia of the vessels. Such transformation of the vessels produces, as a result, a disorder of the circulation. In consequence, the red globules lose their pigment; it then infiltrates the adventitia of the vessels, the cells of the connective tissue, those of the derma and the Malpighian layer, and disposes itself also in the lymphatic canals. During the evolution of this process the greater number of the altered vessels are completely obliterated, the papillæ of the skin becomes stunted and then atrophied; then the pigmentation becomes less intense, until finally it entirely disappears, and at last only a white spot remains at the site of the affection.

Diagnosis.—The pigmentary syphilide is to be differentiated from the pigmentations and achromias which follow the erythematous and other forms of secondary syphilides by its mode of evolution and objective characters. The same may be said of its differentiation from idiopathic leucoderma or vitiligo.

The brownish patches of *chloasma* are frequently found on the face, which is exempt from the pigmentary syphilide.

From *tinea versicolor* it may be readily distinguished by the localization, the absence of desquamation, and the fact that the coloration is in the skin, and not in the epidermic scales. Moreover, the presence of a fungus may be easily demonstrated in the latter.

HÆMORRHAGIC SYPHILIS.

While there is no distinct eruptive form recognized as the hæmorrhagic or purpuric syphilide, there is abundant clinical evidence that hæmorrhages occasionally complicate ordinary syphilitic eruptions.

On account of the excessive vascular congestion which characterizes the cutaneous efflorescences of the early stage, hæmorrhagic effusions occur more frequently in connection with macular and papular syphilides. They may, however, complicate ecchymatous and ulcerative lesions of the later stage. When the transudation of blood takes place in the substance of the lesions the specific eruption presents the aspect of purpura; when the exudation occurs around them the clinical picture is that of a papular syphilide intermingled with a hæmorrhagic efflorescence, each preserving its ordinary characters.

Purpura complicating syphilitic roseola has been described as appearing in the form of plaques sprinkled with minute spots the size of a pin-point, of a somber red color, which does not disappear under pressure of the finger, without elevation, closely set, almost confluent. The plaques are of variable dimensions, one to six or eight centimetres in diameter, distributed more or less generally; the spots of roseola surround without encroaching upon them. Other observers have described larger and more diffuse hæmorrhagic lesions from the size of a millet seed to

that of a dollar, discrete or confluent, complicating the papular syphilide. They are most commonly seen on the lower extremities.

Cornil has investigated the histological characters of hæmorrhagic papules. He found that there was an effusion of blood interposed between the papillæ and the rete mucosum, raising the latter up in places so that its prolongations and the superficial portion of the ducts of the sudorific glands were separated from the papillæ. He thinks that "these bloody effusions are a manifestation of the alteration of the blood in syphilis—of the diminution of the corpuscles. The blood more easily passes through the walls of the vessels; the latter are, moreover, dilated, and their walls are changed in the inflamed papillæ. In preparations of hæmorrhagic syphilitic papules the vessels are always found dilated and their walls thinned at the summit of the papillæ."

Behrend, who has made a study of *syphilis hæmorrhagica* in children, the subjects of inherited disease, in whom it is of much more frequent occurrence, regards the marked fragility of the blood-vessels and diminished coagulability of the blood as causes of the hæmorrhage.

The etiological relation of these hæmorrhagic effusions to syphilis has not been clearly established. Most authorities are inclined to the view that they are of the nature of a complication and always secondary to the syphilitic process. From the fact that alterations in the blood-vessels as well as quantitative changes in the corpuscular elements of the blood are among the most constant and characteristic expressions of syphilitic action, it is surprising that hæmorrhagic phenomena are not more common. I have seen and reported numerous cases of purpura occurring in syphilitics, but have always regarded it as a manifestation of iodism.

As contributory causes to the production of cutaneous hæmorrhages in syphilis may be mentioned alcoholism, varicose conditions of the lower limbs, and depraved states of the general health.

Hæmorrhagic syphilis is reputed to yield readily to the influence of specific treatment. Its transient character and its association with other specific symptoms will serve to differentiate it from hæmophilia.

SYPHILIS OF THE APPENDAGES OF THE SKIN—THE HAIR AND THE NAILS.

By SAMUEL ALEXANDER, M. D.

I. AFFECTIONS OF THE HAIRS (ALOPECIA).

AFFECTIONS of the hairs due to syphilis are not uncommon. The lesions are analogous in many respects to those which occur in syphilitic onychia and paronychia; but whereas the nails are lost only occasionally in syphilis, a more or less extensive falling out of the diseased hairs is the most important and is an invariable symptom of syphilitic affections of the latter. On this account it has been customary to describe all affections of the hairs due to syphilis by the generic title syphilitic alopecia.

The clinical aspect of syphilitic alopecia is exceedingly varied, but, as is the case with most of the cutaneous lesions of syphilis, there are certain essential characteristics by which the loss of hair due to syphilis may be distinguished from other forms of alopecia. There are two kinds of syphilitic hair affections: In one the loss of the hair is primary, and is due to the action of the syphilitic poison upon the nutrition of the hair. In the other variety the loss of the hair is consecutive to certain cutaneous lesions which interfere with the growth and development of the hair. Both varieties of alopecia may occur in the same person at the same time. The hairs upon any part of the body may become affected, but those of the head are most frequently lost. The scalp only may be affected, or disease of the hairs in this situation may be associated with a loss of hair from the beard, the eyebrows, the eyelashes, the axillæ, or the genitals. The hairs in all these situations may be affected at the same time or successively, but in most cases only the hairs of the head are diseased.

Syphilitic alopecia may be partial or complete; it may be general or circumscribed. Loss of all the hairs from the body is, however, rarely if ever met with in practice as a result of syphilis. The hairs are diseased with the same frequency in both sexes.

The loss of hair is a manifestation of secondary syphilis. It occurs most commonly during the first year of the disease, at a time shortly after the first general eruption. In cases that have not been treated or which have been treated improperly, or in which treatment has been sus-

pended too soon, a loss of hair may occur at a later period. The hairs, however, are rarely affected after the second year. Syphilitic alopecia is always temporary, and no matter how extensive the loss of hair may have been, the resulting baldness is never permanent.

When the hairs are lost as a result of ulcerative syphilitic lesions which involve the hair-follicles, the baldness may be permanent, but such a condition can not be included among the varieties of true alopecia.

Cranial Alopecia.—There are two principal varieties of cranial alopecia: the first is primary, the second is consecutive. In primary alopecia the loss of hair occurs without any apparent local cause. It is probable that the poison of syphilis affects the nutrition of the hairs by its action upon their roots, or by its effect upon the general nutrition of the body, but the histological changes which result are not yet thoroughly understood.

In consecutive alopecia the growth of the hair is interfered with by certain cutaneous lesions which occur upon the scalp and involve the hair-follicles. Both varieties of alopecia may coexist in the same case, but the clinical aspect and pathology of each is distinct. Both are manifestations of secondary syphilis. The loss of hair is always temporary and never results in permanent baldness. Reproduction of the hair is certain to occur.

Consecutive Alopecia.—Any of the cutaneous syphilides occurring upon the scalp may interfere with the nutrition and growth of the hairs. The loss of the hair is confined to the site of the lesion. The number of hairs affected, therefore, depends upon the number and distribution of the lesions. The most common syphilitic lesions which cause alopecia are the papular or papulo-pustular syphilide, and the erythematous syphilide associated with desquamation. The first of these is characterized by the presence here and there upon the scalp of little papules which are not very prominent, varying in size from the head of a pin to that of a French bean, of a yellow or yellowish-brown color. These may be discrete or may occur in groups. These lesions itch slightly and may become eroded by scratching, the surface being then covered with a thin brownish scab consisting of dried blood. The hairs upon the site of these lesions after a time lose their luster, become dry and brittle, and fall out; small islands of baldness are thus produced. All the hairs involved by the lesion may fall out, or a part of them only may be lost. This form of alopecia may be and frequently is associated with the primary variety.

The other variety of consecutive alopecia is due to the occurrence of a furfuraceous roseola. The lesion in this form consists of pink or rose-colored lenticular spots, covered with very fine scales, the latter sometimes being almost microscopic. The lesions are discrete, but are so close together as to appear confluent. They are not limited to any special situ-

ation, but are found scattered here and there over the whole scalp. They are covered over with very fine scales, resembling a mild seborrhœa. The hairs involved by these lesions fall out. The baldness may be complete or partial. These lesions usually occur in irregularly scattered patches, more or less circular in shape. A number of circumscribed patches of baldness thus result, but the scalp exposed does not resemble that in true alopecia areata, as it has not the intensely white, shiny appearance seen in the latter, but is covered with fine scales.

This variety of alopecia may be associated with the primary type of the disease.

In certain cases of consecutive alopecia the presence of any eruption upon the scalp escapes notice until the hair has been lost. This is especially true in women.

Of the other syphilitic lesions which cause alopecia the pustular or impetiginous syphilide and the superficial syphilitic ecthyma deserve mention.

Primary or Simple Cranial Alopecia.—The etiology of this form of alopecia is not well understood. Preceding the falling out of the hairs the appearance of the latter may be more or less altered as the result of general nutritive disturbances. The diseased hairs lose their normal luster and brilliancy, become dry, stiff, and wiry, resembling the hairs of the cadaver or the false hairs of a wig. The shafts are brittle and break easily, and this gives an uneven appearance to the hair. In many cases, however, these changes do not occur, the alopecia being the only symptom.

There are two varieties of primary or simple cranial alopecia, in one of which the loss of hair is general, while in the other it is confined to limited areas. Both of these varieties may coexist in the same case. In the first there is a general thinning out of the hair; in the second the hairs fall out in tufts, causing circumscribed patches of baldness. The two varieties are usually associated.

The intensity of primary alopecia varies. In the mildest cases only a few hairs are lost, and the affection is not very noticeable. In other cases the alopecia is much more intense and the hairs fall out in great numbers. The passage of a comb or the fingers through the hair brings away a number of the diseased shafts. The falling out of the hair is also particularly noticeable whenever the hair is washed. More rarely the alopecia is more or less complete; there is a general thinning of the hair over the entire scalp, and here and there large areas of more or less complete baldness appear. In some cases there may be a loss of all the hairs; this, however, is rarely met with clinically.

Cranial alopecia is not confined to any special situation; it thus differs very markedly from other forms of alopecia for which it might be mistaken. Any part of the scalp may be involved; it occurs upon the

occiput, upon the temporal regions, and upon the back and sides of the scalp. It is this irregularity in the clinical aspect which is the most marked characteristic of syphilitic alopecia.

Alopecia of the Eyebrows and Eyelashes.—Alopecia of the eyebrows, like that of the scalp, may be primary or consecutive. The hairs in this situation are more frequently lost in the female than in the male. *Primary alopecia* is much more common than the consecutive form. The loss of hair is irregular: there may be a general thinning of the eyebrows, and here and there little spots of complete baldness. The loss of hair is in most cases very slight, although all the hairs from both eyebrows may fall out. The loss of even a few hairs in these situations is very noticeable, and causes great distress to the patient.

In the *consecutive form* of alopecia the pustular and papulo-squamous syphilides are the most common of the cutaneous lesions which involve the hair-follicles of the eyebrows. In all cases the loss of hair is temporary, and a favorable prognosis may always be given.

The hairs from the eyelashes are much less frequently lost. This symptom occurs very exceptionally. The loss of hair is nearly always partial and incomplete. In certain cases, as the result of ulcerative syphilides, involving the border of the eyelids, the hair-follicles may be entirely destroyed, and the loss of the eyelashes in those cases is, of course, permanent.

Alopecia of the Genitals and of the Axillæ.—The hairs upon the genitals and in the axillæ may be lost as the result of syphilis. The alopecia in these situations may be primary or consecutive, partial or complete. The hair upon the mons veneris in the female and the pubes in the male may be entirely lost, but this occurs but rarely. The loss of hair in these situations, as from the other hairy portions of the body, is a manifestation of secondary syphilis, and the loss of hair is always temporary.

Alopecia of the Beard.—This is usually primary, owing to the infrequent occurrence of lesions upon the face. The loss of hair occurs in a similar manner to that of the scalp, the circumscribed form being more common than the general.

Diagnosis.—The symptoms of *congenital alopecia* in the various types of syphilitic alopecia are so characteristic that mistakes in diagnosis are not likely to occur. Alopecia as a result of hereditary syphilis does not differ in any respect from that in the acquired disease. Congenital alopecia from other causes is very rare. It is usually associated with other atrophic symptoms, and the baldness is always permanent, while in syphilitic alopecia it is temporary. Alopecia is never the only symptom of congenital syphilis, and the presence of other manifestations of the disease make the diagnosis easy.

Senile alopecia is distinguished from that due to syphilis by the date of its appearance, by the parts affected, and by its permanent character. The hair first begins to be lost from the posterior part of the vertex and from the temporal region, and the baldness spreads forward and backward until the entire crown is denuded of hair, the latter being surrounded by a fringe of hair of varying width.

Syphilitic alopecia is not limited to any particular region. Scattered patches of baldness may occur over the entire scalp, the hair being thinned out in the intervening spaces. In syphilitic alopecia the baldness is never permanent.

Premature alopecia, or alopecia simplex, may occur at any age. The loss of hair may be associated with a dry seborrhœa. The baldness usually begins at the temporal regions or at the vertex, as in senile alopecia. The loss of hair is gradual. After a time a new growth of hair, shorter and finer in texture, replaces that which is lost, and this in turn falls out and is replaced by a still shorter growth. Improvement may occur under appropriate treatment, but permanent baldness should always be expected sooner or later. The temporal regions and the vertex become bald first, but complete baldness of the crown may not occur for several years after the disease begins. The situation of the bald areas, the gradual loss of hair, and the permanent character of the alopecia make the diagnosis easy.

Symptomatic alopecia, or premature baldness. Seborrhœa sicca is the most common cause of symptomatic alopecia, especially in women. It should never be mistaken for the consecutive type of syphilitic alopecia associated with a furfuraceous erythematous syphilide of the scalp. The loss of hair is more uniform and general than in syphilis, the scales are more abundant and are composed principally of fatty matter and broken-down epithelium, and the loss of hair is permanent.

Alopecia areata. In the ordinary types of alopecia areata the skin denuded of its hair is of an ivory-white color, smooth and shiny. In the circumscribed alopecia due to syphilis the loss of hair is caused by a circumscribed lesion of the scalp, and there is usually more or less thinning of the hair in the intervening spaces between the bald patches, which does not occur in alopecia areata. In certain cases of the latter disease the bald spots are depressed and atrophied, a condition not found in syphilis.

Ringworm of the scalp might possibly be mistaken for syphilis, especially when the fungus attacks the nails, but the presence of the trichophyton in ringworm establishes the diagnosis.

Psoriasis, when it affects the scalp, may cause more or less loss of hair. The lesions, however, in this disease are most marked along the border of the scalp, and the occurrence of psoriatic lesions elsewhere confirms the diagnosis.

Prognosis.—In syphilitic alopecia the loss of hair is never permanent. The hair may continue to fall out for some time. In most cases some hairs continue to fall out for a period varying from a few weeks to several months. In other cases this symptom may continue for a year or more. Treatment has a very marked effect in arresting syphilitic alopecia, but even if the disease is not treated the loss of hair finally ceases. The hairs lost are always replaced by a new growth; and no matter how complete the baldness may be, the scalp finally returns to its normal condition, a new growth of hair replacing that which has been lost. It very frequently happens that the growth of hair occurring after a syphilitic alopecia is thicker and stronger than that which was lost.

Treatment.—Syphilitic alopecia being a secondary manifestation, the treatment is the same as in other cutaneous lesions of this period. Local treatment is of secondary importance unless the loss of hair is associated, as it often is, with a dry seborrhœa. Moderate stimulation of the scalp is of some value. The head should be shampooed once or twice a week, and afterward a small quantity of vaseline should be well rubbed into the scalp. The numerous hair tonics which are employed produce little effect, and certainly do not check the falling out of the hair.

II. AFFECTIONS OF THE NAILS—ONYCHIA AND PARONYCHIA.

Affections of the nails due to syphilis are of two kinds, onychia and paronychia. In syphilitic onychia the nail itself is primarily affected, as the result of nutritive changes in the matrix or nail-bed, or in both of these. In syphilitic paronychia the tissues around the nail are first affected, the nail itself being secondarily involved by the extension of the lesion to the matrix or nail-bed.

The distinction between syphilitic onychia and syphilitic paronychia is one of importance. Some writers confuse the two affections, and describe them together as similar conditions. Syphilitic onychia consists essentially in some disturbance or interference with the nutrition of the nail, but the resulting pathological changes are imperfectly understood. It is never an inflammatory condition. Paronychia is always accompanied by inflammatory changes in the tissues about the nail, and often results in ulceration. Onychia and paronychia may occur together, and even involve the same nail. This, however, is not the rule.

Syphilitic Paronychia.—The lesions included under this term differ very much in their clinical aspect. They begin in the tissues about the nail, and by extension involve the matrix or nail-bed. In some cases, however, the nail is not affected. Paronychia may involve the toe nails, as well as those of the fingers. The lesions may be single, or a number of

nails may be affected simultaneously or successively. As a rule more than one nail is involved. The lesions occur with the same frequency in both sexes.

Syphilitic paronychia may be divided into three principal types, as follows:

1. Dry syphilitic paronychia.
2. Inflammatory paronychia.
3. Ulcerative paronychia.

Dry Paronychia.—This is the commonest variety. It occurs more frequently upon the fingers than upon the toes, and, so far as my experience goes, is met with more often in women than in men. The lesion consists essentially in a thickening of the epidermis about the nail, resulting in successive exfoliations of the former. The chorium is more or less infiltrated, and in neglected cases or in cases of long standing it becomes thickened, fissured, and excoriated. The lesion begins at a point near the corner of the nail, at the end of the nail groove, as a slight prominence, it is very hard, and is due to hypertrophy of the epidermis at this point. This increases in size and in hardness, and resembles a small corn. It is extremely indolent, is not red but yellowish-white in color, and is slightly sensitive to pressure. The thickening of the epidermis may be limited to this small area of skin at the corner of the nail, or it may extend entirely around the edge of the nail.

The epidermis after a short time cracks, and the upper layers are exfoliated. These loosened layers of dead skin may be rubbed off or torn away by the patient, and the epidermis in this way may be irregularly stripped off for some distance about the nail. The new epidermis underneath becomes thickened and hard, and is in its turn shed or torn away. The diseased skin about the nail thus becomes scaly and ragged in appearance. As a result of injury, the outer margin of the furrows about the nail may become fissured, and these cracks are sometimes very painful. In old cases excoriations and fissures may occur in the skin about the nail, which is rendered thereby sensitive to pressure. The entire dorsal surface of the last phalanx is sometimes involved in this process. The thickening of the epidermis is always most marked at the margin of the nail groove. This form of paronychia most commonly occurs about the finger nails. All the fingers may be simultaneously or successively involved. In the majority of cases several fingers are involved successively, and show different stages in the progress of the disease. The lesions are always chronic and indolent; the inflammatory symptoms are very slight. This form of paronychia usually occurs during the first year, and belongs, like the other varieties, among the secondary manifestations of syphilis. It may occur later, but is rarely met with after the middle of the second year of the disease. It occurs more frequently in pa-

tients who have a rheumatic, lithæmic, or gouty tendency. It is frequently associated with papulo-squamous syphiloderinata on other parts of the body. The nails are but slightly affected. They may lose their normal luster and become dry and brittle, and have a number of *flores unguium*.

Inflammatory Paronychia.—The lesion in this type of paronychia appears in the form of a dry papule at the side of the nail, or in the nail groove, or over the matrix. The inflammatory symptoms vary in their severity. The clinical aspect depends somewhat upon the site of the lesion and upon treatment. In most cases, the course of the disease is as follows: Upon the side of the nail, or at the edge of the nail, or, less commonly, just over the matrix, a swelling appears which is usually round or oval in shape, of a dusky red or a reddish-brown color, and slightly painful to pressure. It is at first about as large as a small pea, but may be larger. It grows very slowly, and is not associated with any very active inflammatory symptoms. The lesion is usually limited to one side of the nail, but when it occurs over the matrix it may spread upward upon either side and involve the entire outer border of the nail groove. The course of this swelling is very slow and chronic. In most cases there is no tendency to the formation of an abscess or an ulcer. The epidermis over the papule may crack and exfoliate. The disease resembles somewhat an ordinary "run around," but it may be distinguished from the latter by its slow course and by the entire absence of suppuration. The lesion remains hard and red throughout its entire course, and finally disappears by absorption. The pain is a rare symptom unless there be ulceration.

This form of paronychia may result in ulceration. When the disease begins in the nail groove the bottom of the latter may crack, owing to pressure of the nail, and in the fissures thus formed large granulations spring up. These discharge a small amount of thin sanious pus. This condition occurs most frequently upon the great toe. The secretion acquires a peculiarly fetid odor, which is somewhat characteristic. The irritation caused by the nail keeps the inflammation active, and the symptoms and appearances are those of an ingrowing toe nail. In these cases the pain is often very severe. The diagnosis of typical inflammatory paronychia is usually very easy, the distinctive symptoms being the indolent character of the inflammation, and the absence in most cases of subjective symptoms.

Inflammatory paronychia usually occurs upon the fingers, more rarely upon the toes. The great toe is affected oftener than the others. In many cases a single nail may be involved. Unless ulceration occurs, the lesions of inflammatory syphilitic paronychia rarely result in the loss of the nail.

The lesions in this form of paronychia belong to the secondary manifestations of syphilis. They may occur at any time during the first or second year of the disease; they are most commonly met with about the sixth or seventh month. Inflammatory paronychia is most common in those who are in poor health. It is not infrequently met with in children as a result of inherited syphilis. It may be associated with onychia, but this is the exception.

Ulcerative Paronychia.—In the previous section I have described the ulceration which may occur about the nail as an accidental result in inflammatory paronychia. This ulceration is not an essential feature of the disease. True ulcerative paronychia is a very different lesion, and in the severer form is a very serious and troublesome affection. This lesion may occur upon the fingers, and also upon the toes. A single nail is often affected. It occurs most frequently upon the great toe. It is a sign of a bad type of syphilis, and usually occurs in cases which have been neglected, or in those in which the constitution is weakened by disease or by dissipation.

The lesion in this form of paronychia is an ulceration which encircles the nail either partially or entirely. It begins either upon the side of the nail, or over the matrix. The ulceration is surrounded by a raised border of a red, dusky, or violaceous color. The ulceration is irregular in shape; its borders are undermined; its base is covered over by large, unhealthy granulations. These secrete a sero-purulent material consisting of thin sanious pus and broken-down tissue. As a result of the extension of the ulceration to the matrix or nail-bed the nail becomes discolored, undermined, and loosened, and this causes loss of the entire nail. In the severer forms of this affection, after the lesion has progressed to a certain point, very marked changes take place in its aspect. The tissues about the ulcer swell and become very hard; the granulations become large and fungous; the entire upper surface of the last phalanx may thus be involved. The enlargement of the latter gives to the finger or toe a peculiar, club-shaped appearance which is very typical. The second and third phalanges appear to be atrophied when contrasted with that upon which the disease is situated. The surface of the ulcer is of an unhealthy violaceous or brownish color, and here and there gangrenous foci may occur. Unless the nail is removed it becomes completely covered over by these unhealthy granulations and by the sloughs, and lies in the center of the ulcer as a foreign body. The discharge from these ulcers is abundant, thin, and extremely offensive. If the nail is not removed early in the course of the disease it is likely to be a source of great irritation, and by pressure cause the most intense pain.

The progress of this form of paronychia is very chronic, and after the ulceration has reached its height the aspect of the disease remains un-

changed for a long time. Under proper treatment the ulceration becomes cicatrized. If the matrix of the nail has only been partially and superficially involved, a new nail is formed, but this is incomplete, of irregular shape, more or less deformed, arched, and ridged. When the ulceration has been deep, and the matrix or nail-bed has been destroyed, the reproduction of a new nail is impossible. In its place there remains, after cicatrization, an irregular surface covered here and there with little, horny plaques composed of imperfectly formed nail.

Syphilitic paronychia is a manifestation of secondary syphilis. It occurs during the first and second years after the appearance of the chancre. It is most often met with between the seventh and twelfth months, but may occur earlier. The prognosis is always favorable, excepting in the severe forms of ulcerative paronychia, and, unless the matrix and nail-bed have been destroyed by ulceration, the reproduction of a new nail may be confidently expected. Where the ulceration is extensive a very doubtful prognosis as to the ultimate reproduction of the nail should be given.

Diagnosis.—The dry forms of syphilitic paronychia are not likely to be mistaken for nonsyphilitic paronychia. In doubtful cases the history of the lesion and the presence or absence of other manifestations of syphilis should be considered.

True inflammatory syphilitic paronychia is characterized by its very chronic course, the absence of all tendency to suppuration, and the hard and painless character of the lesion unless irritated. In the ulcerative form of paronychia the lesion may be mistaken for that of the ingrowing nail, especially when the nail of the great toe alone is involved. In syphilitic paronychia the lesion begins as a dusky-red papule upon the border of the nail-groove, or over the matrix, and the ulceration which occurs is secondary, being due to traumatic causes.

Ulcerative syphilitic paronychia. In strumous individuals, or in those who are susceptible to septic infection, and especially in diabetic subjects, there may occur an ulcerative paronychia, or paronychia maligna, which resembles that of syphilis. In many cases this affection is really a tuberculous infection of the matrix or nail-bed. In the absence of any of the symptoms of syphilis, the diagnosis is often difficult, and treatment can alone decide the character of the lesion. In ordinary whitlow the inflammatory symptoms are usually more acute than in syphilis. In most cases, however, a positive diagnosis can not be made without taking into consideration the history of the case, and the presence or absence of other cutaneous lesions which are characteristic.

Treatment.—In the dry form of syphilitic paronychia the local treatment is unimportant. To protect the diseased finger from irritation is all that is required. For this purpose the finger of an old glove may be worn over the nail. In the more advanced forms of dry syphilitic

paronychia, where much thickening has taken place, some benefit may be derived from the local use of a mild mercurial ointment. Specific constitutional treatment, however, is necessary for the cure of this lesion, as it is for any of the other cutaneous lesions of syphilis. Mercury—and not the iodides—is indicated in all cases. As the dry form of paronychia frequently occurs in those who are gouty or lithæmic, it is important to prevent in such cases, by appropriate treatment, the excessive formation of uric acid.

The treatment of the inflammatory and ulcerative varieties of syphilitic paronychia should be both local and constitutional. In the inflammatory type the specific treatment is the same as for all secondary manifestations of the disease. The ulcerative type being true gunnata of the matrix, the iodides are indicated. The judicious administration of a mixed treatment, with the iodides “in excess,” should be carried out. The local treatment should be conducted upon general surgical principles.

The fact should not be lost sight of, that in ulcerative syphilitic paronychia the loss of the nail is always to be expected. It is, I believe, a wise precaution to remove the nail early in the course of the disease, as it is a very fruitful source of irritation.

Syphilitic Onychia.—The lesions of syphilitic onychia are never inflammatory. The changes that occur in the nails are due to the action of the syphilitic poison upon their nutrition. There are four different varieties of syphilitic onychia. Describing these according to the principal anatomical change which occurs in each, we have:

1. The form in which the nail becomes broken or cracked along its free border (*onyxis craquelé* of Fournier).
2. That form in which the nail is *partially* detached.
3. That form in which the nail is *entirely* shed.
4. Hypertrophic onychia.

The clinical aspect and the nature of the lesions are essentially different in each of these types, and in cases of the same type the symptoms vary in their intensity.

1. The *first variety*, namely, *onyxis craquelé*, is by far the most common. It occurs in a mild and in a severe form. In its mildest form it is analogous to the condition of the hair produced in secondary syphilis, which precedes alopecia. The affected nail loses its luster, looks dull, assumes a yellowish tinge, and has an abnormal number of *flores unguium*. It becomes brittle and breaks easily along the edge. Such a condition is not very uncommon when the secondary eruption has been intense. Bergh does not seem to regard this mild form as especially characteristic of syphilis; and the same condition, or at least a similar one, sometimes occurs in other chronic diseases which interfere with the general nutrition. In the typical form of this variety of onychia the

above symptoms are present, and in addition the nail is marked by parallel lines and ridges. Its free edge, usually most apparent at the corner of the nail, thickens and becomes of a dirty yellow or yellowish-white color. This thickened portion of the nail is friable and brittle; it cracks and breaks easily, leaving the edge of the nail irregular. The whole outer border of the nail may be affected in this way, or the corner only may be thickened. Owing to this dryness and brittleness of the nail and its tendency to crack and fissure easily, pieces are broken off, and sometimes a portion of the nail-bed is exposed. This form of onychia may be and often is associated with one of the forms of dry paronychia. After a time a normal nail is reproduced. The nail shows no tendency to exfoliate. Fournier thinks that this form of onychia is much more common in women than in men. The course of the lesions is very slow and chronic; the disease may continue for weeks, and has a tendency to relapse. A number of nails are usually affected.

2. The *second form* of syphilitic onychia is not, I believe, as uncommon as some authors seem to think. It is fully described by Fournier, but is not mentioned by many of the best medical writers. It occurs more frequently upon the fingers than upon the toes. It is met with in both sexes. The course of the disease is very insidious, and frequently the lesion may escape the attention of the surgeon and even of the patient until separation of the nail is far advanced. The lesion belongs to the secondary manifestations of the disease, and most frequently occurs during the sixth or seventh month after the chancre. It is not accompanied by any pain. The lesion consists in a separation of the nail from the nail-bed and matrix. The separation begins at the distal extremity of the nail, where the latter is attached to the nail-bed. From this point more or less of the nail becomes detached from the nail-bed. This separation is in most cases uniform, the nail being loosened across its entire width. The separated portion of the nail becomes discolored, and a dirty, yellowish-white tint. A white line extending across the nail marks the separation between the detached and the adhesive portions. This is especially noticeable when the end of the finger is pressed away from the nail. The extent to which the nail is detached can be ascertained by passing a probe down underneath it. In mild cases not more than one half the nail is detached, but very rarely the nail may become separated from its bed and from the matrix and fall off, leaving the nail-bed bare. In many cases pieces of the loosened part of the nail may be broken off. This may occur at the end or at the side of the nail. A portion of the nail-bed may be thus exposed, and this becomes covered with a more or less thickened epidermic layer. The reparative process is always slow; but no matter how extensive the disease, restoration of the nail is perfect. The diseased nail, as it grows upward, can be cut off, and the new nail

growing up from the matrix gradually becomes more and more attached to the nail-bed, until finally the nail becomes again firmly adherent throughout its entire length.

This form of onychia may involve a single nail, but the lesion is usually multiple, several nails being successively involved. The degree of separation is not, as a rule, the same in all the affected nails. The nails upon the thumbs and upon the great toes are usually affected, the lesions being most marked in these situations. The course of the disease is very slow even under treatment, the lesions in some cases remain for months, and it always requires several weeks for the normal condition of the nail to be restored. The prognosis is always favorable, and a normal nail may be confidently expected in the most severe cases.

3. In the *third variety* of syphilitic onychia the lesions begin insidiously, and, when the toe nails are affected, may be unnoticed by the patient until they are far advanced. The finger nails, however, are much more often involved than are those of the toes. There are two varieties of this form of onychia. In one, the affected nail becomes thinned behind the lunula, the upper lamella being absent. As the nail grows forward the line between the old portion of the nail and the new diseased portion is marked by an irregularly eurved ridge formed by the base of the old nail. The diseased portion of the nail is marked by longitudinal ridges which have a tendency to converge toward the outer end. The nail loses its luster, looks dull, its surface is more or less irregular and discolored. The diseased portion is very thin and the lunula is absent. The upper lamella at the base of the old portion of the nail splits and cracks, leaving between the two portions of the nail an irregular and rough ridge. After a time the old portion of the nail becomes loose and is wholly or in part cast off, leaving a portion of the nail-bed exposed. In the other and more typical variety of this type of onychia the growth of the nail may be completely arrested. The old nail attached to the nail-bed continues to grow forward, leaving bare the nail-bed between its lower border and the matrix. The base of the old nail, as it grows forward, is cracked, broken, and irregular. The nail itself is discolored and marked by longitudinal ridges. Finally, the nail becomes loosened and falls off, leaving the entire nail-bed bare. The latter becomes covered by a moderately thick epidermis. Unless the matrix or nail-bed be accidentally injured after the nail has been shed, a new nail, under appropriate treatment, is reproduced. This at first may be deformed and distorted, but in all cases is ultimately replaced by a nail of normal appearance. The course of the lesions in this type of onychia is very slow; there is no pain and no inflammation. The lesions are most marked upon the thumbs in the cases I have seen. The lesions may be greatly modified by treatment.

4. *Hypertrophic Onychia*.—This is the rarest form of syphilitic onychia, and yet it has been described by more writers than either the second or the third form. Jullien does not seem to consider it a more uncommon lesion than are the other forms of onychia. This I believe to be an error on his part.

In hypertrophic onychia, as the term implies, the entire nail becomes enormously thickened. Its surface is dry and uneven, and the upper lamella becomes cracked and split. The nail is of a yellowish or whitish-yellow color, and in the furrows which form upon its surface dirt is likely to collect, giving to the nail a very unsightly appearance. The nail is usually thicker at its free margin than it is at its base. The course of the disease is chronic; the diseased nail is ultimately replaced by a new growth, and the nail finally assumes a normal appearance. One or more nails may be involved.

Other Varieties.—Dr. R. W. Taylor has described another variety of syphilitic onychia. The nails affected become dull and opaque. A number of small depressions appear upon the surface, quite uniform in size, being about as big as the head of a pin. The sides of these depressions are sharply cut. These increase in depth, and may involve the entire thickness of the nail, or only the upper lamella may be affected. The surface of the nail is quite uneven, and resembles the outer surface of a thimble. The number of depressions upon each nail varies from two to twenty. Dr. Taylor does not describe the process of repair, and has only seen two cases of this form of onychia.

Mr. Hutchinson describes the case of a woman, sixty-four years of age, who had contracted syphilis from her second husband. When seen for the first time by Mr. Hutchinson she was being treated for a double syphilitic iritis. The nails upon her right hand and right foot were diseased. He describes this as "a splitting up of the superficial lamella, leaving the nail in a ragged, broken condition, and much discolored. The nails showed no tendency to exfoliation." Upon the same hand and foot there was a copious syphilitic psoriasis. An illustration given of one of the affected fingers shows that this was not a form of hypertrophic onychia, nor of the *onyxis craquelé* of Fournier. It might be more properly classed under the first variety of the third type described above.

Mr. Hutchinson also describes a thinning and partial exfoliation of the nail as occurring late in hereditary syphilis associated with keratitis, deafness, and nodes.

All these forms of syphilitic onychia belong among the secondary manifestations of the disease. They usually occur during the first year or eighteen months after the chancre. The nails of the toes are said by many authors to be more frequently affected than those of the fingers. My own observation, however, has led me to the opposite conclusion.

The toe nails or the finger nails may be affected alone or together. The lesions are not symmetrical. Usually several nails are diseased simultaneously or in rapid succession. The form of onychia is usually the same in all the nails diseased. The intensity of the lesions varies in different nails. Different forms of syphilitic onychia may affect different nails in the same patient, but this I believe is exceedingly uncommon. All the forms of syphilitic onychia may be associated with paronychia, but this I believe to be very exceptional. All the forms of syphilitic onychia are extremely chronic, usually lasting for many months unless checked by treatment at the outset. They are all painless affections.

Syphilitic onychia has been said to occur more commonly in cases in which the secondary skin eruptions have been intense. This I believe is by no means always the case. In all forms of syphilitic onychia the prognosis is favorable. Even where the nail is partly or wholly destroyed, a new nail is ultimately reproduced which is normal in appearance.

Diagnosis.—The lesions of syphilitic onychia, when well marked, are not likely to escape notice, but as they are painless they may be overlooked when they are slight, or in patients who are not particular in the care of their hands and feet. The diagnosis in any of the different varieties of syphilitic onychia is usually quite easy, although it can not be made in all cases by simple inspection of the lesions, as similar changes occur in the nails as the result of other chronic diseases which affect the general nutrition. It is necessary, in making a diagnosis, to take into consideration the history of the case, the general condition of the patient, and the presence or absence of other cutaneous lesions which are characteristic. In cases of onychia in which no other cutaneous lesions are present, and in which no history of syphilis can be obtained, the diagnosis should be made by exclusion.

As syphilitic onychia is a manifestation of secondary syphilis, the changes in the nails are usually accompanied by other symptoms of the disease which are characteristic. The changes in the nails which sometimes occur in patients who are recovering from a long and debilitating disease, and those which occur as the result of eczema, psoriasis, or as the result of general constitutional diseases, such as diabetes, should rarely be mistaken for syphilitic onychia, the history of the case and the absence of other symptoms characteristic of syphilis making the diagnosis easy.

Treatment.—The treatment of syphilitic onychia is the same as that for all lesions occurring during the secondary period of the disease. Mercury, and not the iodides, is indicated, and in patients who are anæmic and debilitated the specific measures should be combined with tonics. A gouty or rheumatic tendency should be appropriately treated.

The local treatment consists in protecting the ends of the fingers from injury by covering them with gloves or rubber stalls.

EXPLANATION OF PLATE XVIII.

Fig. 1, ulcerating gumma situated unusually far forward ; nonulcerating gumma near border.

Fig. 2, fissure of tongue in young man four months after infection.

Fig. 3, nonspecific leucokeratosis.

Fig. 4, syphilitic leucokeratosis with fissured condition of plaque.

Fig. 5, exfoliatio areata linguæ in girl of four years, resembling syphilis.

Fig. 6, papulo-erosive plaques of unusual number and distribution in syphilitic young man, painted from wax model made from life by Dr. Levisseur.

Fig. 7, under surface of infant tongue showing first stage (*a*) of benign ringworm, and complete rings (*b*), independent of those upon dorsum linguæ.



Fig. 1.



Fig. 2.



Fig. 3.



Fig. 4.



Fig. 5.



Fig. 6.

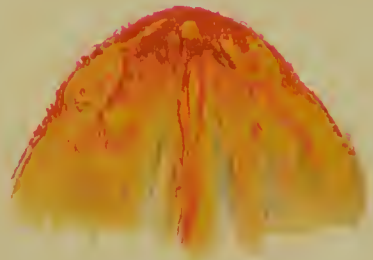


Fig. 7.

SYPHILIS OF THE MUCOUS MEMBRANES OF THE MOUTH AND TONGUE.

By CHARLES W. ALLEN, M. D.

The pathological changes which occur in syphilis mucosæ oris are of the same general order as those observed in eruptions upon the cutaneous surface, though from the nature of the tissues here implicated the morphology is often quite different, and the chronological order in which the changes take place is by no means so regular as in the skin manifestations.

Mouth lesions receive their great importance from the early period at which they begin to appear, both in hereditary and acquired lues; their decided tendency to recur; the extremely contagious properties which many of them possess; and the facility with which lesions situated in such an exposed part may transmit the infection. From a diagnostic standpoint, too, the mouth becomes a most important region in the study of syphilis, for oftentimes here alone will signs of the disease be discoverable; and in late syphilis, or even years after all other signs may have disappeared, changes in the tongue will indicate that the disease has existed, or the active lesions which may continue to crop out will show that it still exists. From a prophylactic view the fissures and erosions which are situated about the lips and commissures of the newborn, as a positive sign of hereditary syphilis, assume a scarcely-to-be-exaggerated importance, playing as they do the chief rôle in the propagation of the disease, and making the question of wet nursing one of great responsibility to the physician.

In the infectious stages of acquired syphilis prophylaxis has more to do with the mouth by far than with any other anatomical region, for it is not only the transfer of the poison directly from the lesion here located, but also indirectly through the medium of the saliva, the mediate as well as the immediate contagion, which has to be guarded against. When the matter of treatment is considered, it is the mucous membrane of the mouth and throat which requires almost constant local attention during the active periods of the disease, and an index of the variety and duration of the general treatment required is oftentimes furnished by the condition of these membranes or the evidences of disease which they show.

PRIMARY SYPHILIS.

The initial lesion is so frequently located in or about the mouth, especially when the disease has been acquired in some nonvenereal manner, that innocent syphilis has of late years attracted much attention. When these accidental infections are added to mouth chaneres, not more innocently acquired than are those usually found upon the genitals, the proportion to the sum total would greatly surprise any one not familiar with the question.

Of all extra-genital situations for chanere the mouth region is that most frequently attacked, and the lips are implicated oftener than the parts wholly within the oral cavity. Indeed, chanere of the lip is at least twice as common as chanere of the tongue. The form assumed by the lesion varies with the point at which it develops and with the tissues implicated, and for this reason I will describe the appearances commonly presented in the different parts.

Chancre of the Lip, though usually single, and more commonly seated upon the lower than upon the upper, may be at times double; symmetrical lesions being situated directly opposite one another upon the two lips, or they may be double or even multiple in the sense of appearing as nodular infiltrations and superficial erosions, or even ulcerations at several points upon a single lip.

Multiple points of infection upon the lips appear to be more likely to occur in infants than in adults, and in the former a single lesion in the middle of the upper lip is rather indicative of infection from the breast.

This median localization is not infrequent, owing to the tendency to fissure formation at this point, the poison gaining easy entrance through the accidental cleft. Indeed, any solution of continuity of tissue may determine not only the site of the sore, but the very fact of infection; and so many illustrations of mouth chanere following simple mouth affections are brought to the notice of those having much to do with the disease, that one is constrained to believe that many exposed persons escape because their mucous membranes are in a healthy state. I have seen chaneres develop on burns of the free border of the lip from creosote spilled in making application to an aching tooth, and from the accidental touch of a hot curling-iron, and in many instances coming under my notice there has been a history of cracked lips or injury preceding the infecting sore. One patient who became inoculated in an open wound gave her lover also a chanere of the lip by means of a kiss, he having had no noticeable breach of tissue before infection. While habitually rounded, and circumscribed with a buttonlike induration at the base, or, at least, giving the sensation of cardboard firmness to the compressing fingers, the sclerosis may present a diffuse, brawny infiltration implicating almost the

entire lip. Induration, while the rule, is not invariably present, or it may be but slightly marked. Oftentimes there is so great a degree of infiltration hardness that the whole affected area will stand out, giving to the lip a peculiar stiff appearance, and there may even be a condition of eversion. In marked contrast to this pronounced form is the simple eroded papule, rare, though possible. The diameter of the nodular chancre does not usually exceed that of a ten-cent piece, the surface is red, and the flattened, exuding or eroded apex becomes covered with a grayish or yellowish layer of detritus, or it may be surmounted by a dirty yellowish or brownish crust. The contiguous portion of the mucous surface of the lip is slightly reddened and infiltrated, but may not be otherwise changed. Sometimes after the chancre has disappeared a mucous plaque will occupy this situation on the inner lip-surface, or a membranous deposit may cover this area as well as the site of the chancre. Instead of this superficial erosion we may have a superficial ulceration, and in one case at least I have seen quite extensive and deep ulceration; but when this occurs one must always think of the possibility of a mixed infection, and the presence of chancroidal virus or some other supergrafted ulcerative process. An ulcerating sore with uneven grayish base and without much induration may be of doubtful significance until the eruption appears.

The Diagnosis in almost all cases is of no great difficulty, and is facilitated by the marked implication of the neighboring glands beneath the jaws and in the region of the throat and neck, causing at times some pain and considerable stiffness. The characteristic picture thus formed is scarcely to be confounded with anything but cancer; and here the lip lesion has come on so gradually and the ganglionic enlargements have been so insidious, never being pronounced till after several months, that even should they reach such a degree of development, the history would at once settle the question. Easy as this differential diagnosis would seem to be, lip chancre has repeatedly been mistaken for cancer, and operated upon. This mistake should not occur, if it is remembered that the cancer almost always comes on the lower lip, is painful, more irregular and ragged, lacks ivory hardness, and is not influenced by treatment.

Chancroid, which is extremely rare, but possible, here and also in other portions of the mouth, as has been shown experimentally, is not indurated and has a more destructive tendency. The comparatively infrequent occurrence of chancroid is accounted for by the number of syphilitic mouth affections which are capable of producing chancre, while the soft sore can alone reproduce its like. Other conditions which might be mistaken for chancre are herpes, traumatism, some of the later forms of syphilis, inflamed fissure in its early stage, and possibly seborrhoeal eczema of the free border and mucous membrane in children. Local

treatment is best carried out by keeping the region continually covered with a mercurial plaster or spread ointment.

Chancre of the Tongue, which comes next in point of frequency, is almost invariably a single sore situated upon the anterior half of the organ and usually near or upon the tip. It is either an ulcer or an erosion, of oval or rounded form, with induration marked only when the tip is the part involved. Though at times deeply seated in the tissues, and capable of leaving extensive fissures behind, the ulcer is more often superficial, and of small diameter. Still, in infants the whole tip may be involved. The under surface of the tongue alongside the frænum or near the border may be the site of an erosion or ulcer, showing some induration at the base. In this location the lesion may be elevated above the surface and undergo very slight ulceration. The borders of the ulcer are not characteristic, but usually slope gently inward to the base in the scooped-out or crater-shaped variety, while in the smooth, flat ulcerations and erosions, with even rosy or perhaps opaline base, the coloring shades off so gradually into the surrounding tissues that a border can scarcely be spoken of.

The adenopathy accompanying tongue chancre is extensive and firm, or of cartilaginous hardness, the subhyoid and submaxillary glands being chiefly involved.

Men are said to be more subject than women to primary tongue syphilis. The statement is one which I am not prepared to confirm, and know of no good reason for woman's decreased liability.

Diagnosis.—It is important to distinguish this from the ulcer of tuberculosis, which, however, is more painful, has less induration, shows more irregularity in outline and base, is often studded with fine granulations springing through a pink, yellowish, or grayish-yellow floor, and may present the miliary yellow points which Trélat has shown to be tubercles in course of development. Again, the microscope might show bacilli, and the ulcer would persist in spite of mercurials. Rapidity of development and extension speak, too, in favor of chancre. Ulcerating gumma or other later manifestation must be carefully excluded, and the dental node and simple ulcer kept in mind, as well as the fact that cancer more often occupies the borders farther back.

Treatment.—Frequent antiseptic mouth baths, containing boric acid, carbolic or bichloride, and occasional weak applications of chromic acid or nitrate of silver. Under the use of mercurials, locally as well as internally, the improvement is rapid.

Chancre of the Gingivo-labial Fold is not much less frequent in infancy than that of the tongue; and

Chancre of the Gum has been occasionally reported. The general characters are much the same in these situations as those already described.

Chancre of the Soft Palate is usually a flat, circular, slightly elevated infiltration, whose surface is either deep red or grayish. The diameter rarely exceeds one and a half centimetre, and the whole appearance may be much that of an infiltrated mucous plaque. Characteristic induration of the base may be made out by grasping the infiltration between a finger passed behind the palate and the thumb, but absence of hardness does not invalidate the diagnosis.

The glands beneath the angle of the jaw are most likely to be enlarged, and there may be considerable pain in the parts. As a rule, in mouth chancre the nearer the isthmus of the fauces is approached the greater will be the discomfort occasioned by it, pain being especially complained of during the act of swallowing.

Chancre of the Mucous Membrane of the Cheek has been observed, but it is very rare.

EARLY CONSECUTIVE SYPHILIS.

Even before the infecting primary sign of syphilis has had time to disappear, evidences of constitutional poisoning begin to show themselves upon the mucous membranes of the mouth, and, if the chancre has been here situated, it may undergo a gradual transformation into what is generally known as a mucous plaque. The mouth thus shows a tendency to early eruptions equal to or exceeding that of the skin, and the proneness of certain of them to recur far exceeds any similar tendency shown by the cutaneous system. The forms under which consecutive mucous manifestations appear are practically the same as those found upon the integument, but by reason of the greater delicacy of the tissues, the constant heat and moisture with which they are surrounded, the more rapid removal of superficial epithelial structures, and the greater vascular supply, they assume features not possessed by skin lesions.

A practical division is into two distinct groups—moist, and dry or scaly lesions; while it must be borne in mind that the mucous plaque, which in its manifold variety constitutes the first group, is only a modification of a macular, a papular, or a tubercular eruption occurring in the mouth. In addition to these forms there is an erythema, a pustular syphilide, and an ulceration, which belong to the moist lesions of this early consecutive stage.

In the dry or scaly group we have several distinct conditions which have been the cause of much confusion, and are to-day often confounded with nonsyphilitic affections. A faulty nomenclature, and an apparent forgetfulness of the fact that syphilitics are not exempt from smoker's patches and other leucomas, have had much to do with the seeming difficulties surrounding the study of this group.

Erythema occurs especially upon the posterior boundaries of the

oral cavity coincidentally with roseola of the general surface, or even before it. While usually assuming the form of a diffuse hyperæmia of dark red color, with an outline sharply defined, either upon the soft or at its junction with the hard palate or upon the pillars of the fauces, and perhaps implicating the uvula, we may find circumscribed, rounded, red spots, which become confluent within a day, forming patches with sinuous convex outline; and it is this well-defined outer margin, often showing the patch to be made up of separate smaller macules, which alone, in the absence of ulceration, serves to distinguish this from a simple catarrhal hyperæmia. In addition to these two varieties there may be a scattered punctate eruption over the vault and possibly the cheek surfaces, and in the latter situation, as well as upon the lips, one may sometimes see small congestive areas during the period of active cutaneous exanthemata. A well-defined sparse macular eruption corresponding to the roseola on the skin, and disappearing without undergoing other change, is probably never observed. From the delicate nature of the epithelium it readily suffers injury, and the red spot or area takes on a light gray color, the epithelium is raised up and becomes detached, and we have before us the

Erythemat-erosive Syphilide, which may leave denuded areas of irregular size and contour upon the hard or soft palate, the pillars of the palate or other part. The eroded areas become coated with a pellicle made up of cast-off epithelium and detritus, and this in turn is rubbed off by the movements incidental to eating, etc. If any decided irritation takes place, a superficial ulceration may result. Much more frequently the erythematous area becomes the seat of a mucous plaque, and many of the latter have their origin in a rounded hyperæmic spot, which perhaps may be somewhat raised above the surface by reason of cellular infiltration. Submucous oedema may attend an erythema of the mouth, but is more often present in the throat. In this as well as in other early mouth changes a generalized stomatitis with increased salivary and other secretion, due, perhaps, to reflex irritation, is often noticed. I have but recently seen a woman who had as yet received no treatment, but whose mouth and throat were covered with mucous patches, present almost as much ptialism as if her gums had been "touched" with mercury.

Diagnosis from simple catarrhal angina is often impossible when the hyperæmia extends backward into the throat, as it usually does. An eruption upon the body coinciding with or coming on shortly after its appearance will confirm what must in some cases be only a suspicion. Perhaps a bluish-red color of the hyperæmia may occasionally strengthen the suspicion of syphilis, while its appearance at the junction of the soft and hard palates argues in favor of the same view.

Treatment is carried out by antiseptic and astringent collutoria and internal medication begun when the diagnosis is established.

The Papular Syphilide can scarcely be said to exist in the mouth in its pure type, but instead we find the modified papulo-erosive, papulo-hypertrophic, and papulo-ulcerative forms. That these are but modifications of the skin papule, is well illustrated by the facility with which papules upon the delicate skin of infants, and wherever they are subjected to heat, moisture, and irritation in the adult, take on moist, diphtheroid, erosive, and even superficially ulcerative characters. These lesions, which are the most numerous, and the most important by reason of their contagious properties, are so well known by the name of

Mucous Plaques that we will consider their various features under this heading. As we saw in studying the chancre, a mucous plaque can succeed it directly, the one passing into the other; and if this change takes place in a primary sore on the lip, for example, the plaque which forms will be moist and of a grayish or opaline color on the inner surface of the lip, looking as though a stick of nitrate of silver had been lightly passed over the area, while on the free border the surface may be dry and covered with a crust. The first evidence of the plaque generally is a rounded and reddened spot anywhere upon the buccal membrane, and may be single, or more commonly multiple. Though usually more or less regularly circular in outline, it may be oval and at times irregular. It is either flat, smooth, and even with the surrounding surface, or more commonly, and especially in the papular form, raised above the level. On the tongue this erythematous stage may go no farther, and the lesion remains as a smooth area seemingly depressed; the surrounding papillæ causing by contrast the deceptive appearance.

The changes which have till now taken place are of inflammatory nature, with vascular dilatation, embryonic cell infiltration, and serous exudation. Now the serum which is squeezed out is loaded with young cells, and it is to their deposit upon the surface that the opaline appearance is due, and which has led French observers to give us the name *plaques opalines*. This term has, however, been equally applied to certain dry or scaly forms; hence it will be well, in employing it in this connection, to speak of the moist opaline plaque. Two lesions are often symmetrically located, or one upon the tongue will have its mate at a point of the cheek just opposite, and one on the tip of the tongue will correspond to another upon the gum or lip. While this would suggest auto-inoculation, the true explanation is probably to be found in the contact irritation, since it is a common observation that the plaque is very likely to form where a rough tooth impinges upon the cheek or tongue; in the angle of the jaws where the last molar makes pressure upon the gum tissues; in the commissure of the lips upon the side where the pipe is held; and upon that portion of the dorsum linguæ where the end of the stem, or the heat of the smoke passing through it, keeps up an irritant action, as well as upon the site of

other lesions which have preceded or are still in existence. For this reason mucous plaques are frequent upon the lips, at the commissures, upon the tip and margins of the tongue, and upon the pillars of the fauces. The usually isolated plaques may exist in groups and become confluent, in which case the outline is crescentic or wavy.

The papular type produced by small-celled infiltration of the papillary body and increase in the mucous papillæ, giving us the *moist papule*, rarely remains unchanged, as we have already stated; but, while capable of disappearing spontaneously, much more commonly becomes covered over with a whitish or grayish film, or false membrane, constituting the *croupous* or *diphtheroid* variety. This transformation is accomplished when the serous exudate from the papule, or plaque, contains an abundance of fibrin, which becomes deposited along with the cast-off cells upon the surface. Some patients show a much greater tendency to this pseudo-membranous formation than others. Now, when this pellicle exfoliates or is rubbed off, or the skim-milk-like coating of the opaline plaque is cast off, along with the uppermost layer of epithelium, we have presented to us the most frequent form of all—the

Papulo-erosive plaque, which is recognized by the varnishedlike surface of the rete mucosum laid bare, presenting a sharply circumscribed infiltration, with a moist, shining, bright or brownish red surface, shown in a somewhat unusual number and distribution (Plate XVIII, Fig. 6). This becomes quickly covered over again with a membranous deposit, showing perhaps under the microscope a few pus-cells, and this process of exfoliation and production keeps up for some time. On the other hand, an interstitial hyperplasia may take place, or the round-celled infiltration may continue as a chronic process, the papillæ elongating, the epidermic layers remaining unshed, and the superficial epidermis showing considerable thickening as well as the rete mucosum, the whole process constituting what is termed the

Papulo-hypertrophic plaque. This exists, for the most part, upon the tongue, and especially upon its under surface, where an exuberance of development is favored by the protected situation and more constant moist heat. It is seen, too, on the lip, the vault of the palate, the soft palate, the uvula, etc. The surface of this elevated plaque, which may be half a centimetre or even more in diameter, showing a decided tendency to spread at the periphery, is irregular from the unequal length of the elongated papillæ forming it, and may be either covered with the diphtheroid layer or show erosion. In the angle of the mouth this form may spread to the surrounding skin surface, and while the mucous portion is covered with a grayish membrane the outer parts will be crusted over with a dry, brownish-yellow deposit. Here especially are the plaques complicated by fissures and rhagades, and if these pass completely through the infiltrated

area they not only occasion much pain and annoyance, but can bring about submucous or subcutaneous connective-tissue changes, followed by suppuration and lymphangitis.

When the elongated papillæ become separated into small groups, papillomatous, *vegetating*, or *cauliflower* forms occur. These only differ from the simple hypertrophies in the division into separate nodules or segmentation of the patch, each becoming separately covered with epithelium, and the whole producing—on the dorsum of the tongue, for example—what the French have described as toad's-back appearance, especially when a number of papular lesions have become agminated and separated by furrows and fissures.

Besides the elongated thinned papillæ of the derma, showing the small, round-celled infiltration which latter proceeds from the vessels, Finger (*Die Syphilis und die ven. Krank.*, 1892) says the microscope shows endovascular changes almost causing obliteration, and pluglike prolongations of the rete between the papillary bodies. The cells are swollen, and the nuclei show several nucleoli. Between the rete cells are found small cells with large nuclei. Even in place of many of the rete cells, corresponding in size to them, and evidently formed by endogenous production, are nests of small cells, often lying close together inside of the still recognizable contour of the former rete cell. These hypertrophic plaques show an inherent tendency to spontaneous resorption, but this may in particular instances be only partial, and a hard infiltration going over into connective tissue, and becoming covered with epithelium, may be left behind until treatment is instituted.

Papulo-ulcerative plaques form where any irritant, such as a decayed tooth, has produced its effect upon an eroded, luxuriating, or resolving papule, or where uncleanness, the use of tobacco, etc., has been at fault, or where the patient injures the patch in scraping the tongue. The ulcer is superficial and painful either because the same irritations which determined its existence are kept up, or the condiments in food and the movements in eating keep it inflamed.

Diagnosis.—The ulcer is below the level and has a yellow base, but possesses no especially marked features by which a positive diagnosis can be made. It closely simulates the simple, herpetic, and aphthous ulcers; but if the papule has been observed before ulceration began, this is an almost positive evidence of its specific nature, for other ulcers do not begin in this way. The ulcerated mucous plaque in the labial commissure is usually accompanied by a deep and painful fissure, perhaps extending for some distance inside the month, and this is kept up by the constant stretching and injury inflicted in opening and closing the month. Unless the ulceration has extended deeply into the tissues, healing takes place with-

out cicatrix being left ; but where, for instance, a jagged tooth has kept open an ulcer of the tongue, a scar may result.

The Diagnosis of mucous plaques is not difficult, for, although they present so many different features and have none which can properly be called characteristic, still attentive observation over a limited period will disclose changes which other diseases do not present. One of the chief points of distinction between this and lesions similar in general appearance is the absence of surrounding inflammatory zone, and even this sign fails in irritated and exulcerating plaques. When several plaques have coalesced upon the tongue, forming an irregular area with polycyclic margin, there is an affection especially seen in infants and children, though in adults too, at times, with which there could be confusion. I refer to *exfoliatio areata linguae*, a condition which has received many different names, and which Parrot maintained till the last was a sign of hereditary syphilis. When we come to speak of inherited syphilis I will refer again to this affection, which is undoubtedly not specific, and which would be mistaken for mucous plaques only on superficial examination. It presents at its very beginning a rounded, yellowish-white, raised patch (Plate XVIII, Fig. 7, a), which exfoliates on one side as far as the center, spreading in the opposite direction, and leaving a denuded surface behind, which is smooth and somewhat redder just within the ring segment. A number of broken rings may festoon the margin of the tongue, or, running into each other, produce irregular figures or geographical outlines (Fig. 5) ; but as these are constantly changing their position and shape, a few days' watching will convince a careful observer that he is not dealing with mucous plaques which have coalesced. Probably the most common mistake made is to confound the aphthous ulcer and mucous plaques. There is often little or no distinction to be made between the ordinary *canker sore* and an exulcerating papule, and concomitant evidence must be relied upon. The patient may, however, state that the small, rounded ulcer is quite tender, whereas the specific lesion is often not complained of, and the nonulcerating papule is scarcely attended with any subjective sensations. The aphthous sore is for the most part perfectly round, scooped out with a decidedly yellow or golden base and a bright red areola.

Treatment of the appropriate kind is of the utmost importance, because of the exceeding contagiousness of these lesions and the facility with which they are caused to disappear, while misdirected efforts may only serve to aggravate them. Unfortunately, however, they return as readily as they go, and, as we shall see later on, may keep coming occasionally for two or three years. Above all, cleanliness must be insisted upon, for foul secretions and decomposing food particles retained within the mouth may alone cause ulceration of the papules. If mercurials have not already

been freely given, a course, preferably by innunction, should be begun at once. If treatment has been pushed, great care must be exercised, and the gums carefully watched, to avoid adding a mercurial ptyalism to that which the lesions themselves may already have occasioned.

If, in spite of general treatment by mercury, associated with cleansing and antiseptic mouth washes, plaques persist and continue to appear, a short course of iodide of potassium may at times be given, with speedily beneficial results. For local applications to each separate plaque the most universally employed agent is the solid stick of nitrate of silver, which is to be lightly brushed over the affected areas. Another caustic which has given me excellent results for many years, often being followed by speedy healing of the plaque, is chromic acid in ten to fifty per cent strength, according to the chronicity and obstinacy of the lesion.

A dilute corrosive sublimate solution is at times useful, and from one to five per mille strength can be employed as a wash or topic. In ulcerated plaques complicated by deep rhagades the same drug can be used as strong as ten or twelve per cent to the sore alone, especially when it has not responded to silver applications.

Chlorate of potash solutions still hold an important place in mouth therapeutics, and permanganate of potash in 1 to 1,000 strength often acts well.

Tubercular Syphilide.—Though authors do not make a separate group for tubercles of the mucous membrane, one often hears *moist tubercle* spoken of as synonymous with mucous plaque, and it seems only proper that we should distinguish the large, flat, condylomatous, or rounded and fissured lesions, especially those which often accompany tubercular and tuberculo-squamous eruptions of the skin, from the smaller papular varieties.

Besides existing on the forward part of the tongue, particularly the under surface, where not subjected to pressure, such hyperplastic forms may occupy the lymphoid region at the base of the tongue. Tubercular eruptions may occupy the vermilion border of the lip and pass over upon the mucous surface in serpiginous outline.

Diagnosis.—Prolonged irritation may maintain a hyperplasia in such a wart-like state that it might readily be mistaken for an epithelioma. It must also be differentiated from late inveterate syphilis of the mouth.

The Pustular Syphilide is another variety which will not be found described in text-books; still, from analogical reasoning, its existence would seem most probable. In variola and varicella we have little, round ulcers upon the tongue, roof of the mouth, and elsewhere, which, though seldom if ever seen in the vesicular or pustular stage, are never doubted to be identical with the manifestations upon the skin.

Finger (*Die Syphilis und die vener. Krankh.*, p. 72, 1892) speaks of a pustular exanthem, of which he has observed two instances, presenting aphthouslike, lentil-sized ulcerations upon the mucous membranes, coinciding with pustular syphilide of the skin.

Diagnosis.—Clinically no distinction is to be made between this and an ulcerating papule. There is the same craterlike excavation, covered with pus secretion, seated upon a brownish-red infiltrated area.

From soft chancre, which it resembles, differentiation is made by the coexisting eruption on the body.

Ulcerating Syphilide, aside from the kind just mentioned, and the breaking-down papule or tubercle as exemplified in the ulcerating mucous plaque already referred to, and which is accidental, there is in this early stage, as in all other stages of syphilis, a possibility of spontaneous ulceration taking place.

In hereditary syphilis there are at times to be observed round, elliptical, or horseshoe-shaped ulcers, which, so far as one can judge, have not developed upon or out of preceding structural changes. In adults who have acquired the disease shallow ulcers are found upon the lips, cheeks, and pillars of the fauces, usually multiple, but sometimes existing as a large, superficially ulcerated area, with irregular borders, especially upon the arch of the palate, and showing red dots of papillary growth pressing through the yellowish or grayish base. The bottom of a fissure upon the tongue or lips often becomes involved in an ulceration process, which is painful, but heals readily when appropriately treated.

An indirect effect of syphilis is seen in the *stomatitis ulcerosa* produced by too rapid pushing of mercurials, especially in patients whose mouth hygiene has been neglected. The ulcer is here most common and most severe in the region of the cheek pressed upon by the molar teeth. It has a dirty-gray, pultaceous base, gives out a foul odor, is very tender, and prevents chewing of food. The borders of the tongue may stand out stiff and waxlike when the organ is protruded, showing an indentation where each separate tooth has pressed, and some or all of these indentations may be the seat of a grayish, indolent ulcer.

Treatment is, of course, diametrically different in these two conditions. In the first, mercury is to be pushed; in the second, not only stopped at once, but means taken to eliminate as rapidly as possible, by hot baths, cathartics, etc., that remaining in the tissues. Locally, however, I have found bichloride of mercury mouth douches of benefit in bringing about antiseptis and hastening a disappearance of the symptoms and healing of the ulcers. This gives force to the theory advanced by Galippe, that we have here a stomatitis of septic origin. Chlorate of potash is a drug justly held in high esteem in this unfortunate and often dangerous complication.

Fissures upon the margins of the tongue, the lips, and especially at the commissures, have already been spoken of as complications of infiltrated patches or mucous plaques. Some of these may become deep ulcerated cracks, prevented from healing by the constant motion to which they are subjected, and those on the lips may extend deeply into either the mucous or the skin surface, and, from occasional hæmorrhage mixed with their secretions, become covered over with dirty, brownish-red crusts. When many fissures exist on the lip and become crusted, considerable deformity may result. Upon the margins of the tongue the perpendicular fissures are frequently the site of narrow, whitish plaques, which recur continually, the membranous deposit dipping down and carpeting the base of the fissure. A number of such threadlike plaques may lie parallel to each other.

Upon the dorsum of the tongue deep clefts may form wherever a small-celled infiltration or smooth plaque has existed, and such fissures may be star-shaped or longitudinal in the axis of the organ, looking as though the tissues had been severed with a knife. The walls lie together, and only disclose the depth of the fissure when separated with the fingers. I have recently seen a young man whose infection dated back four months, and whose tonsils were still covered with mucous patches, who had three such fissures upon the dorsum, one being nearly an inch in length and fully a quarter of an inch deep. They were only painful upon contact with seasoned food, etc. (Plate XVIII, Fig. 2).

Such fissured lesions both upon the tongue and lips may leave permanent scars in healing, which will for all time bear evidence of the disease having existed. Fissures constitute a very frequent sign of syphilis in infancy, and it may be said that the location at the commissures is almost pathognomonic. Careful examination will usually reveal the infiltrated patch through which the crack has taken place. If it extends to the eorium it becomes quite painful. Besides silver and chromic acid, may be mentioned corrosive chloride of mercury in ten-per-cent solution as a local caustic.

Dry and Scaly Forms of the Second Group.—Though occurring at times quite early, these epithelial and deeper structural changes show the greatest pertinacity, and may even appear for the first time ten years or more after the infection. While commonly associated with mucous plaques and often wrongly called by the same name, their clinical features are so entirely distinct that they should receive separate consideration. In the second half of the first year or in the second year of syphilis it is at times noticed that the plaques which come on the borders of the tongue, cheeks, or lips, appear smooth, dry, and shiny, are very persistent, and when once got rid of come back very soon in the same place, or near by, and appear to increase in thickness and dryness rather than other-

wise. In the intermaxillary portion of the cheek, and especially just within the commissure, a grayish or bluish-white radiating or fan-shaped patch is prone to form and persist as a dry, hard, possibly fissured and ulcerated area. Upon the dorsum of the tongue a smooth plaque of pearly hue or faint bluish-white color will be found, on careful inspection, especially when free from saliva, to be entirely dry and devoid of papillæ. It looks, in fact, as though the given area had been closely shaven, and contrasts in a marked way with the surrounding villous surface—a contrast almost as marked as that of a patch of alopecia areata upon the hairy scalp. This smooth patch does not whiten when a stick of nitrate of silver is passed over it, but has the contrast heightened by the staining of the surrounding papillæ. Chromic acid stains the patch somewhat, but less deeply than it does the neighboring parts. The name proposed by Fournier for this latter condition (*glossite tonsurant*) applies well to the appearances presented. When the color is that of the common opal it is designated *opaline plaque*, and, as we have already said, must be distinguished from the humid plaque which goes by the same name, since the former is often the first stage of a leucokeratosis and may prove most refractory, whereas the latter disappears quickly under treatment. Livid patches upon the tongue devoid of papillæ, becoming ashen or pearl-colored, or bluish-white patches upon the cheeks and lips persisting for months or years, gradually changing their size and seat, and finally, perhaps, getting well of themselves, are found in patients who smoke much—in syphilitics as well as in those who give no history or other evidence of the disease. These are known as *smoker's patches*. Smoking is an undoubted etiological fact of great importance in all the dry forms so far considered, but I have seen them in those who never used tobacco at all, and they are now and then seen in women, though much oftener in men. Such nicotine stomatitis is often aided in its tendency to become chronic and develop into thicker patches by the constant irritation of badly conditioned teeth, and in a number of instances I have found mercurial treatment to act as an irritant, inducing or aggravating such superficial lesions.

The more thickened patches will be spoken of under *leucokeratoses*, but I have included here the more superficial opaline along with the simply smooth red patches because they may occur quite early. The purely specific nature of some plaques is beyond question, and others undoubtedly result from the irritation of tobacco in those whose syphilis predisposes the tissues to such changes, while lesions whose general features are identical may follow the inveterate use of tobacco in persons entirely free from the disease.

Diagnosis rests between the dry patch due wholly to the heat and irritant effect of tobacco smoke, and possibly the rough end of a pipe

stem, the moist opaline plaque, the superficial gummons infiltration or sclerous glossitis, the first stages of nonspecific leucoplakia, the confluent form of lichen planus, and *exfoliatio areata lingue*. In the latter the bald patches are bounded upon one side by a yellowish-white border of thickened epithelium. In lichen planus of the tongue small white papules may become confluent and form plaques of irregular outline which show tendency to erosion.

Affections of the Lingual Tonsil.—The base of the tongue, or that portion lying between the papillæ maximæ and the epiglottic fold, is the least explored region of the mouth, so far as the study of syphilitic changes is concerned. The lymphoid tissue which goes to make up what is now generally called the fourth or lingual tonsil is well known to be subject to hypertrophic enlargement and the seat of new growths. This tissue is very similar to that of the true tonsils, and, as the latter are almost constantly implicated in early syphilis, it is not surprising to find that the lingual tonsil comes in for a share of manifestations—though, judging from the silence of authors, they have often been overlooked. A laryngoscopic mirror is generally necessary for a proper demonstration of this rather inaccessible portion of the tongue. The symptoms which would lead to such exploration are a sensation of foreign body in the throat, causing a hacking cough, and a constant desire to swallow. If not relieved, dyspnoea and asthmatic attacks succeed. There is often pain on deglutition. Examination may reveal mucous plaques, or laterally situated elevated condylomata or aggregated papular lesions, perhaps separated by furrows, the summit of some being occupied by a grayish ulcer. A soft, spongelike or fungous growth may be present. As predisposing to lesions in this part may be mentioned excessive smoking, the abuse of alcoholies, and long-continued talking or singing in those who have recently contracted syphilis. Hypertrophy of the tongue tonsil has been observed in hereditary syphilis, and appears to be more common in women than in men. If the voice is much used, pain may be added to the above symptoms, as well as voice fatigue.

The Diagnosis is usually to be made by the association with other signs, often with similar changes in other parts of the mouth. Strumous or simple hypertrophy must be excluded, as well as fibrous, cancerous, or other neoplasm.

Treatment by applications of strong iodine or iodo-phenique solutions in glycerin, or those usually employed in mouth syphilis. If marked hypertrophy exists, the snare or galvano-cautery may be required to effect a speedy cure.

Diagnostic Features of the Early Consecutives.—To distinguish the direct results of the syphilitic virus upon the mucosæ from those which follow in its train upon tissues altered or rendered susceptible is

not always easy or even possible. To differentiate specific eruptions from innocent affections is likewise often difficult but of the utmost necessity, because of their pronounced contagious properties on the one hand, and on the other the fact that the relapsing forms may be the only lesions present by which a positive diagnosis can be made. The marked disposition on the part of the mucous plaque to recur is one of its chief characteristics, and still this is also a feature of aphthous stomatitis and of herpes, and especially that form described by Fournier as *recurrent herpes of the tongue in syphilitics*. As this often shows itself first long after all evidences of the disease have disappeared, it will be more appropriately discussed later on. Febrile herpes, or zona, would in all likelihood be associated with a vesicular eruption upon the skin surface. The individual lesions are small, and when grouped together form eroded areas, whose polycyclic borders show them to be made up of separate elements much smaller than is the case when plaques become confluent. In other words, the wavy outline of the resulting plaque is composed of arcs of smaller circles.

In *hereditary syphilis* some diagnostic points which may be mentioned are that oral lesions are more common shortly after birth than they are in the later stages. At this early age aphthæ and ulcero-membranous stomatitis are rare, while thrush is of quite common occurrence, especially in debilitated infants. In the latter affection the little, milk-white pseudo-membranous deposits occur in a sparse or confluent distribution over the anterior portion of the tongue, buccal and lip membrane, the tissues of which are inflamed, red, and tender. The deposit may be renewed several times before it finally disappears altogether. If any doubt exists, the microscope will show the characteristic spores and threads.

Aphthous ulcer is seen in older children, and each is surrounded by a bright-red areola. It is more painful than the mucous plaque.

Desquamation of the tongue exists in hereditary just as we have seen that it does in acquired syphilis; but that form of rapidly spreading smooth patch, already referred to as *exfoliatio areata linguæ*, is beyond all question a chronic, benign, nonspecific affair, though figured in Parrot's work (*La Syphilis hérédit. et le Rachitisme*, Paris, 1886, Plate XIV) as typical of syphilis. In over twenty consecutive cases studied by myself I have been unable to find evidences of either hereditary or acquired syphilis. I have also seen the affection many times in the adult, and here, too, I have never found it to be in any way connected with syphilis. To the author whose work I have quoted, and whose hospital courses I followed as a student, must be accorded the credit of sincerity in this as in his other scientific observations; but when one realizes that he looked upon all infants having certain cranial and other bony developments as syphi-

litic, and believed that rachitis was an outcome of this diathesis, one can readily understand how these wandering-rash tongues had such a faulty interpretation put upon them.

Upon whatever portion of the tongue a new lesion begins in this affection, it runs through the same general course as those which have preceded it. At first a rounded and somewhat elevated membranous patch (Fig. 7, a), never so large as a moist papule, quickly undergoes transformation into a creeping, broken ring, which leaves in its wake a smooth area. The papillæ mediæ are somewhat red just within the concave yellowish white and sometimes quite thick and broad border, and this rosy hue fades off gradually into the purplish red of the older portions of the patch (Fig. 5). Contrary to Parrot's experience, I have repeatedly observed the ring of white to dip down over the tip or margin near the tip, and extend for some distance upon the smooth under surface of the tongue; and I have also observed rings upon the under surface quite independent of those spreading from the dorsum (Fig. 7, b). Such ringed or serpiginous formations naturally suggest syphilis, and it is for this reason that I have gone so much into the details of the condition which many, agreeing with Parrot, look upon as being really of syphilitic nature—a view which I am convinced is entirely erroneous.

Mercurial stomatitis, when arising in the course of treatment for syphilis, will be recognized at once by the physician on the alert for this accidental complication. The increased flow of saliva, tenderness and swelling of the gums, foul breath, thickly coated tongue, enlarged and indented tongue, etc., go to make up an unmistakable picture. When, however, poisoning takes place in some other way, and a gray, sloughing ulcer forms in the mouth, and it is found that the patient has syphilis, the mistake is possible of considering the ulceration of specific nature, and giving a still further quantity of mercury, with easily imagined consequences. Again, ulcerative mucous plaques and ulcerations from mercury may be so blended that one can scarcely say which is which, and where the effect of one poison ends and the other begins. The mercurial ulcer upon the tongue is irregular in outline and superficial, often occupying the parts indented by the teeth. The surroundings are usually red. Sloughing may occur and deep loss of tissue follow. Upon the cheek surfaces, lips, gums, etc., the mercurial ulcer is also irregular, both in extent and depth, and its base usually has a grayish, sloughing aspect.

Mercurial glossitis presents less swelling than acute glossitis, but the surface of the tongue is very apt to show excoriations. No condition of syphilis resembles it at all closely. There is, however, in early syphilis a condition of stomatitis attending the angina and outbreak of mucous plaques, especially when they are extensive, which causes an increased salivary flow, and this becomes intensified by the retention of decomposi-

tion products. It may be seen even before any mercury has been given, and must be distinguished from that due to the latter.

The rather characteristic grayish coating of syphilitic processes may at times have to be carefully differentiated from the membranous deposit in *diphtheria*, which is thicker, firmer, of a whitish or dirty-yellow color. Surrounding the patch there is swelling, the tissues are bright red, and forcible removal causes bleeding. It is usually associated with unmistakable throat and constitutional symptoms.

Prophylaxis.—Much may be accomplished in the way of preventing severe and troublesome mouth manifestations of syphilis, and also in guarding against the deleterious effects of the mercury administered by suitable mouth hygiene. The gingivitis, which is the early evidence that treatment may have to be suspended, depends at times upon the presence of alveo-dental tartar, which should be carefully removed before the mercurial course is entered upon. Decayed teeth may furnish the conditions required to cause frequent mouth eruptions. At any rate they favor salivation, and for this reason, if for no other, the teeth should be filled, those too far gone pulled, and all put into the best possible condition at the outset. I have made it a custom at the beginning of treatment to send not only the best classes of my patients to the dentist, but even those who habitually pay but little attention to the condition of their teeth. The dentist must, of course, be notified of the disease, that he may take unusual precautions, and thoroughly disinfect his instruments after use. I am convinced that this, together with subsequent mouth hygiene, minimizes the danger of severe implication of this important region of the body. During the mercurial course the teeth should be well brushed, and the mouth washed out with an antiseptic and possibly astringent solution at least twice each day. Among useful drugs for this purpose may be mentioned corrosive sublimate in from 1 to 1,000 to 1 to 20,000 solution; chlorate of potassium in saturated solution; and in stomatitis this may be given internally in ten-grain doses several times a day, besides being employed frequently as a collutory; permanganate of potassium in 1 to 1,000 or weaker solution; chloride, carbonate, and sulphite of soda, borax, boric acid, and Dobell's solution. In hospital practice I have the patients' mouths douched by an attendant, employing a forcible current and an abundance of the solution. Prophylaxis as it concerns the spread of syphilis from mouth lesions can not be too strongly urged. The frequency with which the disease is contracted in kissing, and from accidental contact with the virus deposited upon table utensils and other articles in common use, is almost sufficient to take syphilis out of the category of venereal diseases. In fact, it is asserted that in some regions of Russia syphilis exists almost wholly as a nonvenereal affection. The physician should never neglect, therefore, to urge upon patients the utmost care in

this particular. The public should receive instruction in this matter, and should learn to avoid articles passed from mouth to mouth. Think of the possibilities in the case of mucous plaques in the mouth of a street vender of children's musical balloons and wind instruments! The habit these men have of blowing upon each separate toy before it is sold might be the means of spreading syphilis through a whole community. Literature abounds in instances of infection from pipes, drawing implements, tools, surgical and dental instruments, nursing bottles, and many other accidental causes.

LATE CONSECUTIVE SYPHILIS.

The division into early and late manifestations, I am free to confess, is rather arbitrary, and just where the one ends and the other begins is marked by no sharp line as to time, and by no prominent feature in the nature of the lesions by which the transition can be fixed. There comes a time, however, when the mucous plaques no longer recur with such frequency, and begin more and more to assume the dry form. Infiltration becomes more pronounced in whatever lesions occur, and is often of a decided gummatous nature. True gummata begin to appear and ulcerations become of a deeper and more chronic nature, while that following the breaking down of gumma may prove markedly destructive. The scaly forms now show a much greater degree of keratosis and a corresponding persistency, while sclerosis of tissue of a chronic nature appears.

Mucous plaques, as we have seen, continue to show themselves, but the surmounting pellicle is apt to display more and more thickness, and the tendency to dryness becomes more pronounced. A small white spot upon the tip of the tongue or somewhere on the buccal surface, recurring now and then, or a bald spot on the tongue, may be the only sign to indicate that treatment must be kept up. These later plaques show an inclination to obstinacy, which becomes the more important when it is remembered that they are still contagious until a very late period, and at the end of three years or later may be the means of transmitting the disease.

Treatment is the same as in the earlier stage, but may have to be very energetically carried out by inunctions or injections. In other cases one application of a twenty-five-per-cent chromic acid solution may cause the newly developed "milk-spot" to disappear.

Scaly patches increase in the same ratio in which humid plaques diminish in frequency, and may take on a somewhat circinate or even serpiginous outline.

The dry patch may be the beginning of that very obstinate and many-featured condition next to be described.

Leucokeratoses.—Besides the *leucoma* or smoker's patch, and the *leucoplasia oris* which occurs in those who have never had syphilis, there is a keratosis of the mucous membranes of the mouth which is beyond all question of syphilitic nature. The complexities and confusions which writers on this subject have been led into will be better understood, and the whole question will be in a measure simplified, if the following propositions are kept in mind: 1. That syphilitics are predisposed to the changes induced by smoking, and are more likely to suffer than others from the true smoker's or nicotine plaques. 2. That the use of tobacco predisposes to syphilitic changes of a very similar nature, and which are very difficult to cure so long as the use of tobacco is persisted in. 3. That combinations of two distinct processes or mixed forms may exist. 4. That it is possible for a man who has or who has had syphilis to suffer from a leucoplakia of nonspecific nature.

Leucokeratoses are seen almost exclusively in male patients, and the mixed type is that most often encountered. Indeed, the effects of tobacco and syphilis are so habitually combined that one would be led to look upon smoking as the sole exciting cause, did not an occasional instance present itself in a woman or man who never smoked.

The term *psoriasis*, which is commonly used by German and French writers in describing this condition, I mention only to condemn. It is possible that true psoriasis of the mucous surfaces may occur. I have never seen it. The name should, however, be held in reserve for it, and not be applied to syphilis and other conditions. Even Kaposi (Path. und Ther. der Syph., Stuttgart, 1891, p. 210), who retains this name, found the mouth lesions in patients with psoriasis of the cutaneous surface to be due to previous syphilis, and not to the skin disease, as would at first sight be natural to suppose. Many of the leucoplakias do not at all resemble psoriasis clinically, and pathologically they differ in that the former is a hyperkeratinization, while in the latter a process of dekeratinization goes on (Du Castel, L'Union Médicale, Feb. 11, 1892). Other designations for the same condition are *keratosis*, *opaline plaques*, *milk-spots*, *leucoplakia*, *leucoma*, *leucoplasia oris*, *tylosis*, and *ichthyosis*—the latter being, in my opinion, quite as poor a name as psoriasis. The changes in the epithelium may be of so superficial a nature that only a pearly or opaline discoloration is produced, or there may be so much thickening as to transform the affected region into a dense, leathery patch. We can best consider the condition as it affects different regions separately.

Leucokeratosis Linguae.—Upon the dorsum, the tip, or the borders of the tongue occur rounded or irregular and sometimes gyrate patches of altered epithelium, which may by confluence cover almost the entire surface. They are at first, or in the mild variety, smooth, flat, shining, and

may even appear as dull, rosy spots before marked epithelial change has occurred. As the lesion increases at the periphery the central epithelium may be cast off, leaving inclosed a group of bright-red papillæ, which are swollen and tender, and if much subjected to irritation may become excoriated, bleed readily, form a diphtheroid coating, or ulcerate.

If this course is not pursued, the affection may persist as a slowly thickening and extending bluish-white dry patch, which now and again becomes fissured, and, while it is capable of spontaneous disappearance, is almost invariably persistent in its tenacity, and is cured only after the most energetic measures have been employed, often not giving way to antisypilitic treatment alone, but requiring local applications and perhaps surgical interference.

The erosion which has resulted from exfoliation of the central portion of a given leucomatous spot may in healing again become opaline, and the center of this newly formed thickening may in turn be shed, giving the appearance of a ring within a ring, or several rings may break into each other, causing gyrate forms. The obstinacy shown by this chronic lesion indicates that the epithelial structures have undergone serious disturbances of nutrition, and this is still further shown by the readiness with which leucoplakia undergoes epitheliomatous degeneration in patients of advanced years, especially if a portion of its surface is constantly irritated, as by a sharp projection on a tooth; indeed, cancer of the tongue is preceded in a large proportion of instances by leucoma in one of its many forms.

Concerning the nature of the condition there is much uncertainty, but it is generally believed to be an epithelial hypertrophy, affecting the superficial layers of the epithelium, perhaps preceded by mild chronic inflammatory changes in the mucous membrane.

When the whole or greater portion of the dorsum is involved, the appearance may be that of a tongue closely shaven of its papillæ and coated with a thin layer of collodion, through whose bluish tinge the red surface beneath is seen. In a more pronounced form the center of the dorsum may look as though a brush covered with white paint had been drawn down over it, leaving the margins and tip free beyond the somewhat irregular outline of the white or yellowish-white plateau. Fissures both longitudinal and transverse are usually found crossing this shield-like coating, and giving rise to pain, especially when spicy food is taken. Such rhagades may penetrate the corium, and bleeding or ulceration may take place (Plate XVIII, Fig. 4).

Diagnosis.—The nonelasticity of the tongue favors such fissure formation and causes some difficulty in movements of the organ, but otherwise there are no subjective symptoms.

It is thought by some that the syphilitic leucoplakia is yellowish white

and rather dull in hue compared with the silvery aspect of the nonspecific variety. I can only state that I have seen the condition in syphilitics present a silvery glimmer and tendonlike whiteness, and on the other hand have had a patient undoubtedly not syphilitic in whom a leucoplakia had occupied one lateral half of the dorsum linguæ for many years, the color of which was a dull, yellowish white. A thorough mercurial course, given as a test, had not influenced it in the slightest (Fig. 3).

One of the difficulties of diagnosis is illustrated in a case seen within a few months. The patient was infected twenty-five years ago, and had been a great smoker ever since, consuming at least twenty cigarettes daily. Besides the leucoma present on the buccal surface radiating from the commissure next to be described, the tongue was smooth, and occupied over nearly its entire length by longitudinal streaks of bluish white not quite merging into one another. Near the tip was a stellate cicatrix, the result of previous ulceration. The question which naturally arises in this so frequent class of cases—what part to attribute to the effect of the syphilis whose active symptoms have all long since ceased to appear, and what to the effect of smoking—is one whose solution has not yet been reached. Clinically no distinction can be made between the effects of these two distinct factors acting separately, or, as here was evidently the case, in combination.

Distinction must be made between these opaline plaques which show a decided tendency toward condensation, extension, and transition into chronic keratoses, and those previously described which readily disappear under treatment. Mucous plaques and the idiopathic exfoliatio areata already described will be distinguished by their special feature on attentive observation. Most important is the distinction from nonsyphilitic leucoplakia, which it usually so closely resembles that the history must be taken into account. The latter affection may be said, however, to show more perseverance; less inclination to spread at the periphery, but more to thicken by heaping up of altered epithelium and callous formations; less tendency to desquamation in the central or older parts, with its consequent erosion, ulceration, and new epithelial deposit, and consequently lack of the appearance of concentric rings.

In spite of these more or less constant distinctions, instances will present themselves in which one is unable to make a positive statement. *Prognosis* is unfavorable as to cure in the long-existing pronounced plaques, but fairly good in the superficial forms seen early, where all irritation can be removed, and especially that of tobacco. Prognosis is made especially grave by the tendency in old people to epitheliomatous growths in leucoplakias subjected to accidental or therapeutic injury, as from the application of strong caustics, partial excision, etc.

Leucokeratosis Buccæ is most commonly observed in that portion of

the cheek mucous membrane which lies opposite the line of contact of the teeth when the jaws are closed. Beginning at the commissure as an opalescent or skimmed-milk, rounded, radiating, or irregular-shaped plaque, it may increase by the formation of new plaques in the vicinity, or by the original plaque extending at the periphery, until the whole region lying between the separated teeth, as far back as the last molar, is involved. The epithelium appears dull, swollen, soggy, whiter near the center—not smooth and shiny, as a rule, but cut up into quadrilateral squares by diminutive lines and fissures. These may run out in a radiating manner from the angle of the mouth, making a fan-shaped patch, or from the more thickened and whitened center in various directions, causing a cart-wheel appearance—just as in the tongue-plaque the central portion may be accidentally torn away or spontaneously exfoliated, leaving behind a denuded, easily bleeding, tender surface, which sooner or later becomes covered over again as before.

Smoker's patch, as it affects the buccal membrane, has the same location, and the appearances are so much the same in the two conditions that I am unable to point out any particular points of difference. Most syphilitics who acquire this affection smoke, but some have it without smoking. Like keratosis of the tongue, it may degenerate into carcinoma. Anatomically, the inflammatory changes appear to be centered in the mucous corium, and chiefly in the papillary layer. At first there seems to be a hyperæmia and cell infiltration, and Schwimmer has described as the first clinical appearances a hyperæmie, dark-red spot. This initial stage is not usually observed, the first changes noticed being those due to cloudiness and swelling of the proliferated epithelium. Sections extending through the corium in thickened plaques which have existed for some time show cellular infiltration, especially along the course of vessels, increase in the rete cells, with thickening of both rete mucosum and horny layers.

Diagnosis.—A soggy, dull-gray, more or less irregularly distributed coating of thickened epithelium is frequently seen on the mucous surface of the cheek and lips in dyspeptic, anæmic, diabetic, debilitated, alcoholic, and other individuals. From the habit of pressing in the cheek and biting off portions of this macerated tissue, denuded red areas of irregular shape and distribution may appear scattered over the bluish patches. In mercurial stomatitis a leucomatous state of these same regions is sometimes seen. In some smokers there is a continual cloudiness of small areas with casting off of the epithelium. The persistent rubbing of a tooth against the cheek may cause a circumscribed thickening, and a wart-like change may take place from a variety of irritating conditions. All these have nothing in common with the drier, more shiny, opalescent, or silvery changes usually associated in syphilitics with more or less pronounced leucoplakia of the tongue. A mucous plaque spreading out from

the commissure which it implicates looks sometimes as though collodion had been painted upon the mucous membrane, which was moist, and had therefore dried on in a partial and irregular manner. In leucoplakia the appearances are such as to suggest that the membrane had been carefully dried before the collodion was applied, and that either several coats had been painted on, one upon the other, or that a thin film of cotton had been interposed between two of the layers.

Treatment.—Few cases will be found susceptible of cure by internal treatment alone, and local applications, excepting mild ones, must be used with care. Mild caustics may do harm by provoking malignant growth of epithelium. If radical measures are undertaken they must be aimed at the thorough destruction of the patches. Excision may leave a cicatrix which will occasion as much inconvenience and deformity as the disease; but at the slightest evidence of epitheliomatous degeneration there should be no hesitancy.

If smoking is wholly given up and other sources of irritation removed, a thorough course of antisyphilitic remedies may succeed, and should always be given a trial before surgical measures; the thermocautery under cocaine, etc., are resorted to. Mild forms are readily influenced by treatment, or may even disappear spontaneously.

Gummata, while comparatively rare, occur in all parts of the mouth cavity. Their development is slow and painless, and their discovery is often as much due to objective evidence as to subjective symptoms. The tongue and palate are more often the seat of this form of syphilis than the lips. In point of size the new growths vary from a pin-head to a grape or olive, and over their surface the mucous membrane usually appears stretched and intensely red. The lesions are scattered, single or multiple, or circumscribed and perhaps confluent, and may originate in the mucous, submucous, muscular, or periosteal tissue. They occur four or five years or more after the infecting sore, but may be earlier in precocious cases. Early ulceration is the rule.

The importance of gumma in this region lies in the fact of its frightfully destructive tendencies, almost equaling in some instances those of malignant disease, and, unless checked before much damage has been done, being but slightly influenced by treatment, while at first they are very amenable.

Gumma of the lips is rare, and so is that of the buccal membrane, but both regions may become involved in the gummous process extending from neighboring parts.

Gingivitis Gummosa has been described with ulceration of the gums around the roots of the teeth, which become loosened. Exuberant granulations of a fungous character surround the base of the teeth and occupy the spaces between them. The gums become undermined, and pressure

upon them causes pus to flow out around the teeth, while bleeding occurs at the slightest touch.

The diagnosis is to be made from simple and essential chronic gingivitis, and the generalized mild or severe forms seen in mercurial stomatitis.

Glossitis Gummosa.—The onset of gumma of the tongue often passes without attracting the patient's attention, and when of small size the resulting ulcer may be the first thing noticed. The superficial mucous variety are small, forming little nodosities over the surface like grains of shot. These may attain a French pea or cherry size, project somewhat above the surface, and show considerable firmness. The lesions may assume a curvilinear distribution in their groupings, or two or three may be bunched together. They usually accompany sclerosis of the organ, and readily break down and ulcerate. Submucous and muscular gummata are more common. Here the nodules may reach the size of a pigeon's egg, or even larger dimensions. They are ovoid, painless, usually multiple, though seldom confluent, very firm or hard, break down readily in the central portion, discharging a mucilaginous material through an opening in the mucous membrane, which is at first small, but results in deep, abscesslike ulceration, though rarely in phagedena (Plate XVIII, Fig. 1). In rare instances the tongue is so increased in size that it projects from the mouth, with constant dribbling of saliva. Tongue gumma is a late manifestation, though infiltrated patches of gummous nature may occur in the early months of infection. The resulting ulcer will be considered farther on.

Diagnosis.—The mucous membrane is at first scarcely changed, but becomes violaceous before rupture. When not projecting, the tissues must be pressed between the fingers to show the features of the growth. From chronic abscess it is distinguished by being less clearly defined, less rounded, less movable, and not fluctuating; and from cancer by being multiple, and more centrally located. When single, and situated on the border, carcinoma may have to be excluded by the nature of the ulceration, the benefit following large doses of an iodide, absence of cachexia and pain, and the history of preceding leucoplakia. Cancer is, however, apt to be harder and more circumscribed. Glandular enlargements come on late in cancer; but similar submaxillary swellings are seen in syphilis, and sometimes in those who are not syphilitic. The conditions possibly leading to error are: fibrous tumors, which are harder and more circumscribed; tuberculous and dental nodes; while a foreign body, such as a tooth imbedded in the parenchyma, has been mistaken for gumma. In all doubtful cases, before operation is resorted to a thorough test by treatment should be made.

Gummous Ulceration is by far the most frequent variety of ulcer found

in late syphilis of the tongue, and it may result in such loss of tissue from sloughing that marked deformity follows the cicatrizing process. The ulcer of superficially located gummata is shallow, with abrupt perpendicular borders and yellow, uneven base. This ulcer may begin from the surface, and not depend upon preceding softening of the interior of the gumma.

When deep gumma softens and breaks on the surface there is usually disclosed through the irregular, jagged, and at first small opening an extensive, dirty, grayish-yellow, pulpy or cheesy mass, somewhat like the core of a boil, mixed with blood and pus, or a mucilaginous fluid escapes. When this mass has been cast off by degrees there remains a crater-formed ulcer, with undermined, indented, or firm, rounded borders.

The ulcer is seated upon infiltrated tissue, and the clifflike sides lead down to a sloughing or lardaceous base. The gummy ulcer may become serpiginous and extend over the base of the tongue, involving the glottis in the œdema which usually surrounds it.

These ulcers give way with surprising rapidity to treatment.

The table on next page will aid in distinguishing the gummos from cancerous and tuberculous ulcerations of the tongue; and while in most cases little difficulty should be experienced, some may tax the physician's diagnostic powers to the utmost.

Gummata of the Hard and Soft Palate are of the same character and have the same insidious beginning as those which have already claimed our attention. Their great importance lies in the destructive course which they pursue, unless promptly checked, causing perforation through the bony walls of the hard and often complete destruction of the soft palate, including the uvula, within a comparatively short space of time. I have seen an opening made in the velum through which the thumb would pass, within a few days of the discovery of the gumma. The process begins as a nodule in the mucous membrane, which softens, breaks, and leaves an ulcer, which may extend and deepen; or the parenchyma is first affected, or more frequently indeed, the process may have a subperiosteal or periosteal origin, or even begin in the nasal fossa and extend toward the mouth through the bone, which softens and is carried away or removed as a sequestrum. The middle line of the hard palate is a favorite seat for an ovoid, tense, elastic, and sometimes painful swelling, which soon softens and ruptures, with subsequent exposure of the bone. Even then it is possible for repair without perforation or any noticeable loss of tissue in the healing, as instanced in a recent personal case. Unless treatment has been begun soon enough, however, we must expect more or less of an opening between the nasal and mouth cavities, with altered voice and difficulties in swallowing. In an exaggerated instance of this unchecked destructive process, for a long time in the City Hos-

GUMMA.	EPITHELIOMA.	TUBERCLE.
Occurs upon the dorsum and far back.	Upon the border.	Upon the tip.
Often multiple.	One-sided. May be on under surface.	Usually single.
Preceding deep node.	Warty growth, or leucoplakia.	No preceding tumor.
Uleer begins in center of indurated mass.	Is followed by woody hardness.	Begins on surface; little induration.
Increases rapidly.	Less rapidly.	Slowly.
Suppurates like a boil.	Ichorous, foul, bad-appearing ulcer.	Less suppuration.
Excavated.	In relief, on fungoid tumor.	Flat.
Pain only on motion.	Spontaneous and lancinating; otalgia.	Tender.
Borders thin, abrupt; edges undermined.	Thick, spreading, irregular, elevated.	Beveled, jagged.
Base, grayish, adherent mass.	Reddish or yellowish.	Pale, flabby, pinkish, or yellowish.
Surrounding swelling, redness.	Induration.	Minute granulations in surrounding parts undergoing caseous degeneration; points of Trélat.
No bleeding.	Small drops of blood on pressure.	Only when injured.
Glands rarely if ever enlarged.	Enlarged late.	Not infrequently enlarged.
Iodide test positive.	Negative.	Negative.
No cachexia.	Cachexia (late).	None.
Microscope shows infiltration by embryonal cells.	Large and distorted squamous cells; cell nests; ingrowing of interpapillary epithelium.	Leucocytelike infiltration; giant cells; bacilli.
Rarely hereditary.	Heredity frequent.	Family and often personal history of phthisis.
Occurs at any age.	Usually late in life.	Usually early adult life, but may be late.
Cured by drugs.	Not checked or diminished.	If ulcer heals over, it breaks out again.

pital, a young girl had lost almost the entire roof of the mouth, and all the soft parts between the mouth and the throat. The nasal bones and the external nose had been eaten away, so that one looked directly into a huge and hideous cavity. The greater part of the perforation may have been accomplished before any sign is found upon the mucous surface of the mouth. Then attention is directed to the parts by perhaps a burning feeling, or pain on pressure over a given point, and inspection reveals a reddened spot, quite sharply defined and perhaps slightly œdematous. This soon shows a central opening, through which a probe may pass into an extensive cavity. If the soft palate or its pillars are the parts involved, the infiltration which has, as a rule, taken place in the loose connective tissue causes prominence and a livid red hue of the overlying mucous membrane, which soon ruptures, with subjective symptoms of pain and discomfort in swallowing. At first a rounded opening discloses an ulcerating cavity with lardaceous walls and surrounded by œdematous

livid tissue, and this usually goes on to complete perforation. Unless checked in this stage the destructive process may advance with alarming rapidity and virulence, melting down all tissues in its invading march. Just as in other regions, the beginning may have been a single or multiple lesions, the latter possibly becoming confluent. A permanent, rounded, punched-out opening may remain, or, if small, the cicatrizing process may have almost closed it up.

Diagnosis.—In the velum, gumma may require observation for a time to make sure that the process is neither lupus, cancer, rhinoscleroma nor lepra.

Treatment.—In all these gummatous processes the first and all-important thing is the free administration of one of the iodides in rapidly increasing dose up to the point of tolerance. If mercury has not previously been given in sufficient quantities, a course can be entered upon at the same time.

Glossitis Indurativa Syphilitica.—Besides the circumscribed gumma of the tongue, already described, there may occur in late syphilis a deposit of numerous small gummata in the muscular substance, giving the appearance of hypertrophy, and also a condition of diffuse infiltration, or hyperplasia of a portion or the whole of the organ, shown by a hardness and an increase in volume, which has also been termed *hypertrophy of the tongue*. There is, however, no true hypertrophy. The interstitial connective tissue is at first infiltrated with cellular-elements, hence the designation *glossitis interstitialis* is more appropriate. The swelling, which is a painless one, may assume such proportions that the tongue is compressed between the teeth and becomes indented by them around the whole margin; or, if the swelling is one-sided, this half of the organ feels firm, and is much fuller and rounder than the opposite side. The voice is altered by the unwieldy organ, making the words sound peculiarly thick.

The onset is quite as insidious as in the gummy node, and in its course of rather slow development occasions but little disturbance. The enlargement may persist for months and then a process of contraction ensue, with gradual decrease in the whole organ or the part, the tissues becoming firm and hard, the surface smooth and devoid of papillæ, while distributed over the dorsum or margins are leucoplakialike patches of thickened epithelium, which exfoliate, leaving reddened areas. In this stage the restricted movements are more noticeable than ever. The whole or a portion of the surface becomes lobulated or divided up by furrows and lines into more or less regular areas, with perhaps here and there clefts of greater or lesser depth, and we have before us the picture, which has been named *glossitis dissecans*, from the dissectedlike state which it suggests. Fournier explains the contraction which succeeds the enlargement by the for-

mation of a fibro-plastic weft which runs through the organized areas of hyperplasia, becomes condensed, and thus strangles the tissues of the tongue, causing atrophy and sclerosis. This author describes a superficial and a deep *glossitis sclerotica*; the former appearing as isolated or diffuse patches of a deeper red than the normal surface, breaking down with great readiness, producing fissures and ulcers, and leaving behind milk-white areas. The second, or parenchymatous glossitis, corresponds with that which I have described at the beginning of this chapter, and, as we have seen, superficial changes always accompany it. Such a tongue is not at all exempt from gummy formations, and, indeed, small as well as large ulcers which form upon the surface often owe their origin to softened gummata. Ulceration from mechanical causes, pressure of the teeth, retention of irritants in the clefts or furrows, are also not uncommon in this chronically altered tissue; but they heal readily, while the gummous ulcer may produce considerable destruction of tissue and add to the deformity already present, before they have been checked by treatment.

The Diagnosis is to be made between this sclerosis and the sub-mucous sclerosis in advanced stages of superficial leucoplakia, where we find longitudinal whitish bands producing contraction and deformity. In the form of deep, woody induration, and especially when an ulcer exists upon the surface, mistake for cancer is a possibility to be remembered, but the pain is lacking; the ulcer, which dips down into the tissues instead of standing out upon a decided tumor as in cancer, does not bleed as in the latter case; the cachexia is absent, and there may be multiple points of ulceration. Mixed or selero-gummous forms are not rare. Prognosis is favorable if treatment is entered upon early and suitably pushed. If contraction and deformity have occurred, little can be done.

Treatment.—Here, as in gummy node, iodide of potassium or other salt must be run up to the limit of tolerance. If mercury has been withheld, one should not delay by giving it internally, but the more rapid means of introduction by inunction or the hypodermic method should be employed.

PARASYPHILITIC MANIFESTATIONS.

Some of the epithelial and connective-tissue changes which we have already considered should undoubtedly be looked upon as evidences of syphilis which has existed rather than as indicating the presence of the disease in a still active stage. The obstinacy of many of the leucokeratoses, the slight effect or the noneffect of energetic treatment in these cases as well as in certain seleroses, would lend confirmation to this manner of thinking; and, besides, analogous parasyphilitic conditions are to be found in other regions of the body.

Keratosis, or chronic epithelial stomatitis, with opacity and thickening of the epithelium which has lost much of its vitality, is a condition similar to that in which changes in the skin follow long-continued irritation. The surface of a plaque which may at first have been white and smooth becomes roughened or even warty, fissures occur as a greater degree of hardening takes place, and the whole assumes a more yellowish and duller hue.

Fissures in these persistent plaques, as well as in other deformities of the tongue or lips following syphilis, become sources of great annoyance by reason of the pain from acids and spices, and sometimes from smoking and even talking.

Schwimmer found such painful fissures to be relieved by applying with a brush several times a day: Papayotin, 0·5 to 1·0; distilled water and glycerin, $\bar{a}\bar{a}$ 5·0.

The following has also been advised: Phenie acid, 2·50; tincture of iodine and glycerin, $\bar{a}\bar{a}$ 12·50.

Cicatrices bear much the same relation to the active stages in which they were formed as do these supra-added manifestations. They are indelible indications that the disease has existed, but give little aid in determining whether it may still exist. The cicatrix after chancre is usually scarcely apparent unless there has been considerable ulceration, but after ulcerating gumma there is either a calluslike hardening, giving a certain stiffness to the tongue—if this is the part affected—or after much destruction about the soft palate, uvula, and pillars, ropelike bands may result in distorting the parts and binding them down in various directions. The uvula is often drawn to one side, and here, as well as in the whole region of the throat, the cicatrix is of a dull white color.

The scar from early fissure is depressed, linear, or stellate as a rule. Where there has been much ulceration it may be of irregularly rounded form and depressed below the surface. Upon the tongue deep fissured scars may remain through life, having the natural color of the tongue tissue, their depth and width only being seen when their walls are separated with the fingers.

The cicatrices of the early ulcerations are rarely deep or extensive, having rather the appearance of lines of milk or silvery whiteness, or smooth, glistening, somewhat depressed scars. Cicatricial perpendicular lines upon the margins, and deep or star-shaped fissures upon the dorsum, are always strong evidence of preceding syphilis, for scarcely any other diseases cause them.

Patches of cicatricial tissue appearing as bluish-white discolorations are distinguished from superficial leucoplakia, which they somewhat resemble by being slightly depressed below the level and in remaining stationary and unchanged.

Recurrent Herpes in syphilitics has received considerable attention at the hands of Prof. Fournier, and as the superficial erosions resemble somewhat mucous plaques of small dimensions and polycyclic outline, it is important that they should be distinguished. They are supposed to be due not only to the irritation of the tissues by preceding outbreaks of syphilis, but to that of tobacco, mercury, etc. Hence, if mistaken for manifestations of syphilis still active, and mercury is given, the condition may only be aggravated.

The erosions of herpes occur in repeated crops upon the borders of the tongue, but also upon the dorsum. They are of short duration, healing of themselves in from eight to fourteen days, but may be kept up by smoking, etc. The color is somewhat red after the grayish epithelium has been shed. When the herpes is in the form of a *bouquet* and the micro-cyclic character of the outline has disappeared, the diagnosis is impossible.

An example under my observation for four years, during which time there were repeated outbreaks, occurred in the person of a young man who had become infected with syphilis four years before I first saw him, and had ceased for some time to show any manifestations of the disease. The eruption appeared principally upon the tip and margins of the tongue, but also at times upon the free and inner surface of the lips. The lesions were small, round, smooth, eroded or exfoliated patches, from a line to two lines or less in diameter, surrounded by a distinct pearly-white ring. This ring was not so broad or thick as that of the ringed wandering rash, nor did it have the yellow hue of the latter. A further distinction was in the fact that the lesions did not spread at the periphery, changing their location and gradually invading the whole dorsum as the marginate exfoliative glossitis, several times spoken of in this chapter, tends to do. Antisyphilitic treatment failed to prevent repeated outbreaks, but the attack itself was usually cut short by attention to diet, mouth hygiene, and the application to the individual denuded spots of a twenty-five to fifty-per-cent solution of chromic acid. For the past two years the patient has been free from the annoying condition and has married—an act which he desired but feared to do so long as the tender spots kept showing themselves, in spite of my assurance that they were not contagious. So far as I could judge in this particular case, they were not due to the direct irritation of mercury, for they would appear when no drug had been given for a long time. Still, there is this to be said, that since treatment has been wholly stopped the attacks have ceased. Recurrent herpes seems to me to depend more upon disordered digestion, and perhaps the reason why it is common in those who have had syphilis is because the treatment they have undergone has tended to derange the stomach's function in a way that is reflected in the region of the mouth.

Ulcerations may occur upon the tongue, lips, or cheeks of old syphilitics which are in themselves nowise specific. This is especially apt to be the case in the sclerosed or otherwise altered tissues of the tongue. They are due to mechanical irritation or injury, or depend upon some accidental or infectious cause. In the same way an ulcer or ulcerating fissure may form in the center of a patch of leucokeratosis upon the tongue or cheek following exfoliation or mechanical removal of a portion of the altered tissue. These ulcers possess no syphilitic qualities, do not heal under specific treatment, and may prove sources of great annoyance to patient and physician.

The simple ulcer in sclerous glossitis, where the tongue is perhaps furrowed, lobulated, and deeply fissured, often begins in one of the crevices, and is due to the irritation caused by retained secretions and food particles which undergo fermentative changes. When having its starting point upon the upper surface it often depends upon the injury inflicted by a carious or faulty tooth. It is important to distinguish this from the gummous ulcer which develops in these same sclerosed tongues, but in the latter there is a surrounding indurated mass which is lacking in the simple ulcer, whose base, too, does not have the dirty yellowish or grayish pulpy appearance of the gummy form. The fissured ulcers are often very painful. Treatment helps show their independence of the syphilitic virus, for they are not influenced by mercury or iodides. If, however, the irritant which has occasioned them can be removed, antiseptics and simple measures will often succeed.

Pemphigus Linguae is a rare condition, of which I have seen one instance in a patient who had recovered several years before from all active signs of syphilis. Similar to the action of lesions in *herpes récidivant*, the bullae recurred at intervals upon or near the tip. When seen by me a red, eroded, lentil-sized round lesion marked the spot, which the patient assured me had at first been a bulla filled with a slightly blood-stained fluid. One such lesion left upon the tip a round, grayish patch the size of two pins' heads, which still persists. Hoffmann has observed one such case, but Butlin, in his excellent work on diseases of the tongue (to which I desire to acknowledge my indebtedness in the preparation of this chapter), mentions pemphigus of the tongue only as it occurs in connection with pemphigus of the general surface.

SYPHILIS OF THE JOINTS, MUSCLES, BURSÆ, TENDONS, AND APONEUROSES.

By FRANK HARTLEY, M. D.

SYPHILIS OF THE JOINTS.

THE *arthropathies* of syphilis have been called to the attention of the profession by Babington, Ricord, and Richet principally, but it was due to Lancereaux (1863) that the syphilitic character and origin of this form of disease was firmly established. He found in the subsynovial and fibrous tissues of the knee-joint well-developed gummata, which he believed to be syphilitic in origin.

Oedmansson established the fact, now fully recognized, that a papillary synovitis, with defects or ulcers in the cartilages of a joint, was of the same nature.

Schüller, Falkson, Landerer, Finger, and Voisin have substantiated Oedmansson's investigations and conclusions by finding the very same conditions.

In all their cases not only a papillary synovitis was present, but in the cartilages of the joints defects were found. These defects were surrounded by a series of elevations. The floor of the defects was depressed, and covered with a striated fibrous tissue which lead directly to gummatous tissue, extending into the articular ends of the bone beneath the cartilage.

If we combine with these later discoveries the cases long since recognized as syphilitic—i. e., the secondary involvement of the joints from gummatous osteomyelitis and gumma in the fibrous tissues about the joint—our knowledge of the pathology can be said to be very complete, though we recognize that our diagnostic powers are yet lacking so far as objective symptoms alone are concerned.

Varieties.—The condition known as *arthralgia*, in which we recognize only a functional disturbance in the joint or joints, is frequently seen as the first symptom of the general systemic involvement, or as a prominent symptom in hereditary syphilis.

In the acquired variety it frequently appears at a period when the cutaneous eruption has not made itself evident. Less frequently it occurs at a time when the eruption is present.

In hereditary syphilis it is often the only evidence of the disease.

It is a simple functional disturbance, so far as one can judge from the objective symptoms, and is "felt" only by the patient. We do not know just what tissue is the seat of the disturbance, as there is no change in the joint appreciable to the surgeon. Often no fever or eruptions accompany this condition. The only tangible symptom is the pain in the joint or joints, which is increased at night. This pain is similar to what we often hear spoken of as growing-pains in the young, and in the older we class as rheumatic pains. These painful sensations are characterized, however, by their increase at night. They continue for a longer or shorter period, and disappear without any apparent cause. They return at irregular intervals, and are rebellious to all forms of treatment excepting the antisypilitic, which acts upon them immediately.

Acute Polyarticular Serous Synovitis.—In the acquired form of syphilis this is not uncommonly present in the so-called secondary period. As in acute articular rheumatism, several joints are involved, and are the seat of intense pain. At the beginning of the attack several joints are involved. At the end of one week, or at most two weeks, the process results in the resolution in all the joints involved, except in probably a single joint in which the process is slow, and which is likely to become a chronic synovitis.

Objectively the joints are swollen, painful, and attended with a slight degree of local heat. Sometimes there is a redness in the skin over the joints, but this is exceptional. The temperature of the patient is slightly elevated. Within certain limits the bones are freely movable upon each other, producing no pain. The extremes of flexion and extension, however, do cause pain. Fluctuation is present in some joints. The duration of this condition is from one to two weeks, with resolution and a complete return of motion.

In the so-called tertiary stage of acquired syphilis, as well as in hereditary syphilis, three varieties of joint affections exist, which may be considered as epiphenomena of the pre-existing lesions found in the bones or juxta-articular tissues. The first variety occurring in this stage is characterized by distinctive conditions in the synovial membrane and cartilage. In the synovial membrane the lesion consists in a well-marked growth of thick tufts covering the whole surface, and especially well marked at the reflexions of the synovial membrane upon the cartilage. In the subsynovial structures hyperplasia of all its constituent tissues is present, which in the older cases extends to the capsule of the joint and its ligaments, and is interspersed with small gummata. In the cartilage chondral gummata may be present alone, but they are most frequently associated with a gummatous osteomyelitis and papillary synovitis.

This chondral involvement in syphilis is evidenced by a transforma-

tion of the cartilage over circumscribed areas into a dense cicatricial tissue, somewhat depressed beneath the level of the surrounding cartilage, and covered and bordered by small tufts. These cartilaginous defects are the evidences of subchondral gummata, which have been replaced by a dense cicatricial tissue. These defects in the cartilages and the papillary synovitis are peculiar to syphilis.

It occurs some years after infection, and may be monarticular or polyarticular.

If the subchondral gummata are alone present, the symptoms point to a hydrops, in which the pain is not severe, though generally increased at night. The swelling of the joint is marked as the fluid within it is large in amount. The skin over the joint is unaltered, and the capsule appears normal. The functions of the joint are in very small degree interfered with. As the disease progresses and the papillary growth upon the synovial membrane is added, the hydrops becomes more persistent, and the change in the synovial membrane is appreciable to the examiner's touch. In the further progress of this condition there are added a hyperplasia of the subsynovial and periarticular connective tissues, with interspersed small gummata, its contraction, and an ankylosis of the joint more or less marked, with a diminution, though not a complete disappearance, of the fluid within it.

The synovitis and arthritis following gummata in the ligaments, capsule, sheaths of tendons, and subcutaneous tissue about the joint, are also seen in the tertiary stage of syphilis. As the gumma approaches the synovial membrane a serous exudation takes place within the joint, with very little observable change in the synovial membrane. In the older cases of this variety the synovitis is distinctly papillary in character, with or without a fibrous hyperplasia of the subsynovial tissues. The exudation within the joint is constant and persistent. When the gumma undergoes coagulation necrosis and liquefaction, and enters the joint, the resulting exudation is sero-purulent, and the synovial membrane and subsynovial tissue are distinctly gummatous. Should the gumma involve the joint, and open externally by a fistulous tract, secondary suppuration may occur.

In cases where an osteomyelitis or periostitis which is syphilitic in character has existed, there is apt to be added, by extension directly through the bones and cartilage, or indirectly through the capsule and ligaments, a syphilitic joint disturbance, which is either a serous synovitis or a papillary synovitis, with or without a hyperplastic growth of the connective tissue in the capsule, interspersed with small gummatous foci. This condition, in addition to the evidences produced by an osteomyelitis and periostitis, gives signs of either a simple hydrops without marked thickening in the synovial membrane, or a hydrops with thickening in the synovial membrane and crepitation, with only slight interference in the

motions of the limb. When the hyperplasia is added to the papillary synovitis—i. e., the connective-tissue gummatous growth in the subsynovial tissue and capsule—hydrops, though constant, is not marked, but the normal motions of the joint are interfered with, and a partial ankylosis is present. In the severest cases this interference in motion is complete.

In hereditary syphilis it has been my good fortune to see one case of the rare variety of synovitis which is described as a subacute specific inflammation by Schüller. In the case which I saw the disease was bilateral, and involved the knee-joint of a child three years of age.

It was a subacute inflammation, with only a moderate swelling in the synovial membrane and capsule of the joint. The exudation into the joint was slight in amount. Pain increased at night, was not severe, and the skin over the joint was only slightly reddened. No evidence of any osseous lesion could be obtained. So far as any examination could be carried out, the bones and periosteum, the cartilage and perichondrium of the articulating bones were in all respects normal. Its response to antisyphilitic treatment, and the distinct history of the case (the mother and father had been treated for this disease), leave no doubt as to its true character.

This is the variety in which the synovitis is but an epiphenomenon of the necrotic foci and defects in the cartilage due to gummata, although the epiphyseal cartilage seems to be in no way involved.

More common than the above in hereditary syphilis are those cases which occur as a complication of a gummatous process in the tissues about a joint. Such a process may be primarily situated in the capsule, tendon-sheath, or aponeurosis covering the joint, or a periostitis and osteomyelitis may involve the joint by direct extension to the soft parts investing the joint. The character of the synovitis is that of a subacute or chronic serous synovitis in the early cases, or of papillary synovitis in the later stage, and sometimes with a marked connective-tissue and gummatous formation in the subsynovial and capsular tissue, producing a more or less marked ankylosis.

The third variety in hereditary syphilis is one in which, following an epiphysary osteomyelitis or periostitis (*sive* perichondritis), a gradual serous exudation takes place within the joint. As the process advances, papillary tufts appear upon the synovial membrane, which are in turn followed by hyperplasia of the subsynovial and capsular tissue. If the osteo-periostitis is followed by a complete separation of the epiphysis, or if the foci of necrosis advance through the cartilage of the joint, the effusion within the joint is puriform in character, and the symptoms become more acute. This variety is always attended with a circumferential swelling or enlargement involving the epiphysis, which is more or less evenly marked upon all sides of the bone. It resembles in appearance somewhat the epiphyseal enlargement in rickets. At times the resemblance to white

swelling is striking in so far as the tumefaction and globular deformation of the joint are concerned. The tumor, however, is caused almost exclusively by the epiphysary periostitis, with the thickening of the synovial membrane and periarticular tissue. There is, in contradistinction to the tumor albus, no œdema, no tendency to inflammatory exacerbations, no excessive limitation in the motion of the joint. Patients with this variety can often walk very well. In rare instances the joints present a chronic hydrops, with epiphysary osteophytic growths very similar to arthritis deformans.

Diagnosis.—The syphilitic arthritides or synovites belong to the late period of syphilis, and occur only rarely in the period of the first eruption or the first recurrent period. They are mostly monarticular, and they involve most frequently the sterno-clavicular and knee joints. Next to these joints, the elbow, wrist, ankle, metatarsal, metacarpal, and interphalangeal joints of the fingers and toes are involved.

Though it occurs more frequently upon one side and in a single joint, it may involve several joints upon the same side. Its course is always subacute or chronic, and the absence of pain to any great extent, and fever, are characteristic. The subjective symptoms are not at all in proportion to the objective local lesions.

Where other evidences of syphilis are present the diagnosis is easy; but if such evidence is not attainable, and the history of an injury is only that of a very slight affair occurring in a well-nourished individual, with local symptoms leading one to make a probable diagnosis, the favorable effect of antisyphilitic treatment, both local and general, will quickly decide a dubious case.

In hereditary syphilis the most marked diagnostic symptoms are :

1. The age, three to twenty-eight years; most frequently between the ages of five and fifteen.
2. Osteoperiostitis, resulting in hyperostosis in the tibia, ulna, radius, humerus, femur, metacarpal, and phalangeal bones.
3. Douleurs osteoepes.
4. Syphilitic habitus.

Prognosis.—The earlier the joint involvement occurs the more favorable will be the chances of recovery. The later they occur the slower they are in their course and the less liable they are to recover. The papillary growths upon the synovial membrane, and the hyperplastic gummatous growth in the periarticular tissue, are not capable of a complete resolution. The same holds good for the defects and scars in the cartilage.

Where a complete destruction of the joint is due to the destruction of the ends of the bones, cartilage, and ligaments, the result of an osteoperiostitis gummosa, the freely movable and useless joint seldom results in ankylosis, under careful antisyphilitic treatment.

MYOSITIS.

It is not improbable that a part of the rheumatic pains which precede or accompany the eruption of a constitutional syphilis depend upon a light and acute *irritative myositis*. This variety resembles closely muscular rheumatism, in that the pain is increased by touch and by motion without any evident abnormality in the muscle. It is indeed difficult to tell how much of this manifestation of pain, which is increased by touch and motion, is dependent upon changes in the muscles, fascia, tendons, bones, or joints in many instances.

As a *chronic interstitial myositis*, syphilis of muscle depends upon a small-celled infiltration arising from the perimysium and extending into and between the muscle bundles. It destroys the muscle bundles by a pressure atrophy, and is transformed into a connective tissue, with the gradual loss of the muscle. It is a diffuse process within the muscle, and is at first generally attended with pain.

It is not infrequently combined with the gumma, so that within the infiltrated muscle small gummatous foci are found. The muscle gradually becomes uneven, shortened, and irregular in contour. The scar tissue left is not so extensive, nor are the deformities so marked, as in the gummatous variety.

Gummatous Myositis.—It may develop as a slowly growing and perfectly painless infiltrate in the muscle, which upon examination may be either soft or gummy where the liquid constituents exceed the cellular, or as a hard nodule or patch where the cells are in abundance. Accompanying these gummatous processes there are usually found more or less extensive inflammatory changes.

Commonly, however, the gumma is of a more rapid growth, and pain is a marked symptom, which is increased by touch and motion. The muscle in all the more rapidly growing gummata is in a state of constant contraction. The growth at first moves with the movements in the muscle. It is more frequently found near the tendon than in the center of the muscle. As it increases in size it becomes softer in consistency, and the muscle assumes a condition of permanent contracture. In favorable cases resolution occurs, and the muscle fibers destroyed are replaced by a connective tissue. The common course, however, is not that of resolution.

The granulation tissue forming the gumma is very perishable and unstable, as it frequently has no well-formed and healthy blood-vessels. These granulomatous masses do not undergo further development. They perish by fatty degeneration and coagulation necrosis, and the cellular inflammatory infiltrate surrounding it is transformed into a connective tissue.

This issue of syphilitic inflammations depends chiefly upon the virus, and in less degree upon the endarteritis which is always present, and in which the lumen of the vessel is narrowed or entirely occluded. It is consequently more often seen that the gummatous myositis advances beyond the muscle and involves the fascia and subcutaneous tissue. It becomes more prominent, softer, and less movable, and finally breaks through the skin, leaving a deep, sinuous ulcer, from which necrotic masses, chiefly fascial, are extruded. After healing, which requires weeks or months, a cicatricial tissue remains, which binds together the muscle, fascia, and skin.

Myositis Ossificans Syphilitica.—In rare instances an ossifying myositis follows a periostitis ossificans. It commences in the attachment of the muscle to the periosteum, and gradually involves the whole muscle. It is sometimes spoken of as a *myositis ossificans progressiva* by those who think it due to a lesion in the central nervous system. A marked case of this variety has been described by C. Hawkins, in which ease the pressure of the finger upon the muscle was alone sufficient to cause ossification in the muscle, which under iodide of potassium would disappear.

Atrophy of muscles in syphilis has been ascribed to a syphilitic lesion in the nerves rather than to a lesion within the muscle. The muscles involved in syphilis are the biceps and triceps brachii, cucullaris, pectoralis major, masseter, buccinator, biceps femoris, tibialis posterior, peronei, and the muscles of the tongue and palate. It is rare for these lesions to occur early in the course of syphilis. It occurs more frequently after the longer continuance of the disease. Of Mauriac's eleven cases, he found that the period of the appearance was seven, three, nine, fifteen, six, four, twelve, and two months after the first evidence of the disease. Mauriac's average time was the sixth to the seventh month. Zeissl saw it after fifteen years. I have myself seen it after nine, twenty, and thirty years. Fournier has seen only a single case of gumma in muscles other than those of the tongue in hereditary syphilis. This case involved the superior and internal portion of the right calf, and was situated in the gastrocnemius muscle of a child of fourteen years. He has seen four cases in the tongue in hereditary syphilis. The ages of the patients were twelve, fourteen, sixteen, and twenty-four years.

Muscular lesions in syphilis occur generally in several forms in a single muscle or in several muscles. Where a single gumma occurs in a single muscle, especially in hereditary syphilis, it is usually mistaken for sarcoma.

Diagnosis.—The earliest diagnostic signs are increased tension, consistence, size, and nocturnal pain limited to the muscle. The further development of the lesion, if it be the chronic interstitial syphilitic myositis, is that of permanent contracture of the muscle with an altered consistency and contour; if the process is gummatous, however, its diagnosis

from sarcoma becomes difficult without the aid of antisyphilitic treatment. The gumma is, however, distinctive, in that it presents no tendency to further development, but undergoes an extensive fatty degeneration and coagulation necrosis; whereas in the sarcoma, though no future development of an organized tissue occurs, its tendency to coagulation necrosis and fatty degeneration is not so early marked. Gummata are again more frequently seen as multiple lesions, either in a single or several muscles. Traumatic influences act equally in both diseases as an occasioning cause. In all cases the previous history of the case and the action of antisyphilitic treatment must in a large measure decide the case.

BURSITIS.

The bursites seen in syphilis are divided into two varieties: the acute or irritative, and the chronic or gummatus bursites.

The *acute or irritative bursitis* is a rare affection. It is an accompaniment of the joint lesions occurring in the secondary period. It is a bursitis attended with redness, pain, heat, and swelling. The bursa is tense, and fluctuation can be obtained. It is capable of a complete resolution, and such is generally the course. They have been seen by Finger, Fournier, Gosselin, and Vernheil.

The *chronic or gummatus bursites* are more frequently met with than the above variety. The affection is in the main painless, and of an indolent character. The bursa is either primarily involved, or it becomes secondarily involved from some gummatus process in its neighborhood. Whether primarily or secondarily involving the bursa, the disease presents itself as a nodular infiltration of the bursa, with a small amount of puriform fluid within it. As the process advances the subcutaneous tissue and skin become involved. Pain now is a more noticeable symptom. Finally, the skin is destroyed and a gummatus ulcer is left.

Keyes has described fourteen cases, and in twelve the bursa was primarily involved.

The præpatellar bursa was involved five times; the bursa over the tuberosity of the tibia, once; the bursa between the semitendinosus and the lateral ligament of the knee-joint, twice; bursa over the malleolus, once; bursa beneath a corn, once; bursa in palm of hand, once; bursa over the olecranon process, once.

Men and women are affected in equal proportion.

The earliest time at which it appeared was one and a half year after the chancre; the latest period at which it was seen was eight and a half years.

TENDONS AND SHEATHS OF TENDONS.

Marked swelling of the sheaths of tendons has been described by Hölder, 1851. Verneuil has seen in the early stage of syphilis, in the tendon sheaths of the finger, an acute and painful hygroma, over which the skin was unaltered in appearance. It involved in four cases the extensors and tendons of the fingers, and did not extend above the dorsal ligament. They occurred at a time when the throat symptoms and the roseola were present. Fournier considers them common, and has seen such hygromata in the extensors of the toes, the tendo-Achillis, biceps brachii, biceps femoris, the supinator longus, and peronei.

Baumler describes a case of Nunn's, in which a gumma arose on the tendon sheaths of the dorsum of the foot, as well as upon the tendon sheaths of the inner side of the knee, in the same person.

Chouet described a similar case upon the sheath of the musculus peronei anterior. The syphilitic gummatous manifestations involving the sheaths of tendons are pre-eminently late in their development, occurring often fifteen or twenty years after infection.

The *acute irritative tenosynovitis* is painful, and attended with an exudation within the sheath. The skin over the sheath is red in proportion to its acuteness. Motion is painful, and is attended with a crepitation, due to the fibrin upon the sheath. The result is either complete resolution or a hydrops of the sheath.

The *chronic tenosynovitis* presents itself as a painless, fluctuating hydrops, with crepitation at times upon motion. The skin over the sheath is unaltered. It shows but little tendency to remain stationary, but is constantly advancing, with a hyperplasia of the tendon sheath, and with increased exudation of a thick, tenacious fluid.

These varieties occur in both sexes, and most frequently involve the extensors of the fingers and toes, the biceps, peronei, and less frequently those about the knee-joint.

The *gummatous tenosynovitis* is recognized as a round or spindle-shaped swelling involving the tendons. It grows slowly and painlessly, remaining as a gummatous swelling, becoming calcareous or extending to the surrounding tissues—i. e., to the subcutaneous tissue and skin.

These gummata occur most frequently upon the tendo-Achillis, the biceps, or radial tendons.

APONEUROSES.

The early involvement of the aponeuroses has been observed, yet the later variety of syphilitic disease, the gumma, is the more common. The early manifestations have nothing which allows of a definite diagnosis

except the localized pain, which is increased at night and by pressure. This is most evident in the Galea aponeurotica of the skull, which is sometimes the seat of the headache.

Gummatous infiltrations in the aponeuroses result more frequently from extension from other tissues—namely, the muscles and subcutaneous tissue—than is the case of a primary involvement. Lang mentions having seen a case in which the intermuscular aponeurosis of the arm was alone involved.

SYPHILITIC AFFECTIONS OF THE BONES.

By W. R. TOWNSEND, M. D.

THE various bones of the body may be affected with syphilis either during the primary, secondary, or tertiary stages of the acquired, or during the early or late stages of the inherited, form.

Gummata comprise the most typical lesions, and may occur in the periosteum, beneath it and on the bone proper, within the bone, or in the medullary canal. They are tumors, so incorporated in the neighboring tissues as to give no well-defined boundaries, and rarely become encapsulated.

In color they are pinkish gray, more or less vascular, and resemble granulation tissue. In process of growth a gumma presents a series of nodules, each possessing its own center of formation. These nodules are more or less distinct, and are recognized by the fact that the cellular elements of the central portion are small, and have fallen into a molecular detritus, while those of the periphery are larger, round or fusiform, and are confounded with the neighboring embryonal tissue. The nodules themselves are very irregular in their form and dimensions, varying from one fifteenth to one tenth millimetre in diameter. The blood-vessels penetrate to the periphery of each nodule and may there ramify. They are permeable, and contain blood even when the center of the nodule is in a state of atrophic degeneration.

In the development of the gumma two stages are recognized. During the first the medullary substance of the bone is increased, there is proliferation of the cells of the marrow, and the osseous canals are filled with embryonal tissue. The osseous trabeculæ become thinned and absorbed, thus giving rise to large medullary spaces in which the gummatus nodules form.

The next stage consists in the formation of hard, caseous masses, which may eventually become calcified, or in the formation of abscesses, which sooner or later come to the surface. In other words, gummata produce a *rarefying osteitis*, and this is later followed by a *formative osteitis*. In this manner a gumma may be entirely surrounded by new bone, and the diameter of the bone be thus increased. Fig. 1 clearly illustrates such a case, as reported by Lamelongue and quoted by Fournier. The left

humerus in the lower half of its diaphysis shows a fusiform swelling, the bone being twice its natural size. The swelling, the edges of which are even, is situated a little above the epiphysis; on section, the center of the bone is found to contain a gumma, partly broken down and separated at some points from the bone structure.



FIG. 1.—Gumma of medullary canal. Hereditary syphilis. (After Fournier.)

Gummata, when affecting the exterior of the skull, appear at first as soft tumors, and subsequently become firm as the bone-cells beneath develop as a result of an osteoperiostitis. Fig. 2, reproduced from Fournier, shows a case of gummatus tumors of the skull. In this child, as a result of hereditary syphilis, there were present gummata of the bones of the skull, humerus, femur, lungs, etc. The gummata of the skull were in varying stages of development; on the frontal bone alone there were six, the largest extending from one supraorbital arch to the other, and measuring some four centimetres in length, being raised at least two and a half centimetres from the skull. The results of specific disease are modified in proportion as the tissue attacked is the periosteum, the bone proper, or the medulla. Age also has an influence, for lesions occurring in early life are more apt to undergo degeneration than those occurring later. The ultimate results are either atrophy of tissues already formed or the formation of new products. If gummata develop in the periosteum, the result is a periostitis.

Syphilitic Periostitis.—In the earlier stages of bone disease the periosteum is the tissue most frequently affected. The first step in the pathological change is hyperæmia or increased vascularity, which produces a swelling consisting of a network of new connective-tissue fibers, in the interspaces of which are found

numerous nucleated cells resembling white blood-corpuscles. The walls of the blood-vessels and lymphatics become thickened, and around them are layers of cells. The fibrous elements of the periosteum become more swollen, the vessels contract, mixed infection occurs, and an abscess forms. When gummata which produce periostitis do not go on to degeneration, and inflammatory changes do not occur, then the periosteum may

resume its normal condition or permanent thickening may remain. Very frequently, however, we have involvement of the bone beneath and an osteoperiostitis results.

Specific Osteitis does not vary from nonspecific except in causation, and is in most cases primarily a rarefying osteitis, and subsequently a result of the destruction of tissue; when reparative processes take place, there is a formative osteitis.



FIG. 2.—Gummata of skull. Hereditary syphilis. (After Fournier.)

Rarefying Osteitis.—In this variety of bone inflammation absorption of the bone tissue plays a prominent part. The disease begins in the soft tissues about the blood-vessels, there is enlargement of the superficial Haversian canals, and as a result a thin layer of bone becomes eroded and finally disappears, or, by pressure of the cellular products on the blood-vessels, the circulation may be arrested and a partial necrosis occur. The first changes consist in the formation of embryonic cells in the medullary spaces, in the Haversian canals, and under the periosteum. These cells resemble those found when bone develops from cartilage. The portion of bone affected becomes embryonal in character, and an enlargement of

the Haversian canals occurs by absorption of the osseous tissue about them. The osseous lamellæ are eroded in such a manner as to form notches, the bone-corpuscles at the edges of these open, and the contained cells escape and join the embryonal cells in the medullary spaces. These osseous lamellæ gradually disappear, and adjoining Haversian canals unite to form irregular spaces in which the embryonic marrow proliferates. This absorption has been supposed to be due to the fact that pus from these osseous abscesses contains lactic and phosphoric acid; that the absorption is preceded by a mucous change; that the bone-corpuscles enlarge and cause a solution of area of the osseous substance, corresponding to the cartilaginous capsule from which the bone-corpuscles and its territory are formed; and that the absorption is due to a fatty degeneration of the bone-corpuscles; but Cornil and Ranvier think no one theory satisfactorily explains the condition.

In syphilitic disease the process is usually limited, although it may extend over the entire surface of a flat bone or from end to end of a long one. While the irritation continues which causes a rarefying osteitis, no attempt at repair occurs. More and more tissue becomes eroded, and the broken-down material is carried away, or remains in the form of a sequestrum surrounded by granulation tissue. As soon as treatment is instituted, or when the discharge is free and irritation no longer exists, the tendency is to repair—to a formative osteitis.

Formative Osteitis.—In this process the formation of new bone is the prominent feature, and this new bone may form beneath the periosteum and between it and the old bone, within the bone itself, or within its medullary cavity. On the surface of the bone, when the deposits are very small, they are termed *osteophytes*; when larger, *nodes* or *exostoses*; and if the entire length of a bone is involved, the process is known as *hyperostosis*. Where the new bone encroaches on the medullary canal we speak of *enostosis*. An examination of the new bone thus formed shows that on the surface of a long bone, for instance, the vessels and trabeculæ have a different direction from those of the old bone. The Haversian canals and blood-vessels are perpendicular to the surface. This is due to the fact that the osteoperiosteal vessels in the new tissue come from the Haversian canals at the surface of the bone, and it is around these that the new lamellæ are formed, as in physiological ossification, from elements of embryonal tissue.

The formation of new trabeculæ is at the expense of the embryonal cells produced in the rarefying osteitis, and takes place around the edges, where the disease is of least intensity, and thus there may exist depressions, surrounded by new bone, with much irregularity on the surface of the original bone. The trabeculæ come from the old bone and traverse the embryonic tissue; along their sides are found numerous cells, which

become partly imbedded in the new osseous tissue forming about them. It is not necessary that the periosteum should cover the bone in order to have new formation of osseous tissue upon its surface; but the preservation of the periosteum, and especially the vessels of its under surface which enter the Haversian canals, assist greatly.

When cavities have been produced in the bone proper or in the parts adjacent to the medullary canal, new bone may form in a similar manner as on the external surface, and thus close or fill up the cavities. Occasionally in this same manner a central sequestrum may be surrounded by new bone, and repeated attacks of osteitis occur until it is removed, and this may take years.

When formative osteitis involves the bone proper, it leads to its sclerosis or hardening; the process is also spoken of as eburnation and as condensing osteitis. This new bone is very dense, and of ivorylike consistency. If it occurs near the medulla, the process may encroach upon and even almost entirely obliterate the canal. On the surface of a bone this hardened portion may simply involve a part or may extend around the entire circumference. In rare instances a condensing osteitis may occur just under the periosteum, while the center of the bone is being destroyed by a rarefying osteitis, and the new and dense bone thus support a shaft that might otherwise easily break.

A rarefying or formative osteitis may cause changes in the shape of a bone, and especially at the articular ends. In this manner joints may be seriously affected in their motion and utility. In young children a separation of the epiphysis and the diaphysis may occur, which leads to the condition spoken of by Parrot and others as pseudo-paralysis. If the condensing osteitis is active, premature ossification may occur, and this is most often seen in the skull, resulting in asymmetry and the production of the so-called "natiform skulls."

When the new bone so constricts the Haversian spaces and medullary canal that the blood supply is cut off, we have necrosis. That portion of bone the blood supply to which is thus cut off is termed a *sequestrum*. It acts as a foreign body, and about it there occurs a rarefying osteitis with numerous granulations. The Haversian canals become enlarged by the proliferation of the marrow and the absorption of the osseous lamellæ. This absorption continues, destroying the living trabeculæ and also those in which the vessels are obliterated, until the canals communicate one with another. The disappearance of the trabeculæ entirely isolates the sequestrum in the midst of a granulation marrow. The result of this process is that the sequestrum is bounded by a sinuous surface, the prominences of which correspond to the vascular distribution where the circulation has ceased.

When the necrosed tissue is on the surface of a bone it soon separates

and is carried away in the discharges. If deeper in the bone, the separated portion acts as a foreign body and produces a constant irritation, so that

a sinus connecting with the exterior may exist until the sequestrum is finally removed.

The irritation may diminish at times and the sinus close, but it will never heal until all the necrosed bone is eliminated.

The sequestrum may resemble normal bone, both externally and internally. It may present losses of substance here and there, or be smooth and regular. In the skull the diploë may be changed into compact tissue, and the sequestrum may be incased by a rim of new osseous tissue, but it is never completely walled in, as occasionally occurs in the long bones.

A microscopical examination of sequestra from the skull shows the medullary cavities of the diploë replaced by narrow canals, and these are due to the formation of new osseous tissue, deposited layer by layer in the interior of the old canals, thus narrowing them. This process continuing, the canal may be completely obliterated, so that at the center of the concentric layer, instead of a canal, there is found one or more bone-corpuscles.

Osteomyelitis.—When the medulla is first affected we have



FIG. 3.—Exostosis of tibia. Acquired syphilis.

the pathological process known as osteomyelitis. Gummatous osteomyelitis may develop very slowly, and in some cases the gummata never break down, but may become practically encapsulated and surrounded either by the old or by new bone. If the gumma breaks down it may find an outlet either through the epiphysis and into a neighboring joint,

or through the bone proper. If the process become infected with pus-cells either before or after coming to the surface, symptoms may be acute and the process rapid, and, if not properly treated, destructive to life. From an osteomyelitis the entire bone may be thickened, or, as in cases where there is simply a small gumma present, the change in size of bone may be very slight.

In acquired syphilis in the same subject may be found gummata that have become organized, with bony tumors resulting; and also instances



FIG. 4.—Destruction of external and internal tables. Acquired syphilis.

where the breaking down of these tumors has resulted in necrosis and loss of tissue. Figs. 3, 4, and 5 are all from the same patient, and were photographed from specimens in the Pathological Museum of the New York Hospital. Fig. 3 shows an exostosis on the tibia, giving both the external appearance and a view on section through the bone. The tumor is distinctly localized, and is situated at the junction of the middle and upper third.

In Figs. 4 and 5, the skull shows, in the posterior part of the left parietal bone, a large loss of substance, oval in shape, and about three by two inches in diameter. Its long diameter is in a line running from the vertex of the skull downward and backward, and only the interior half

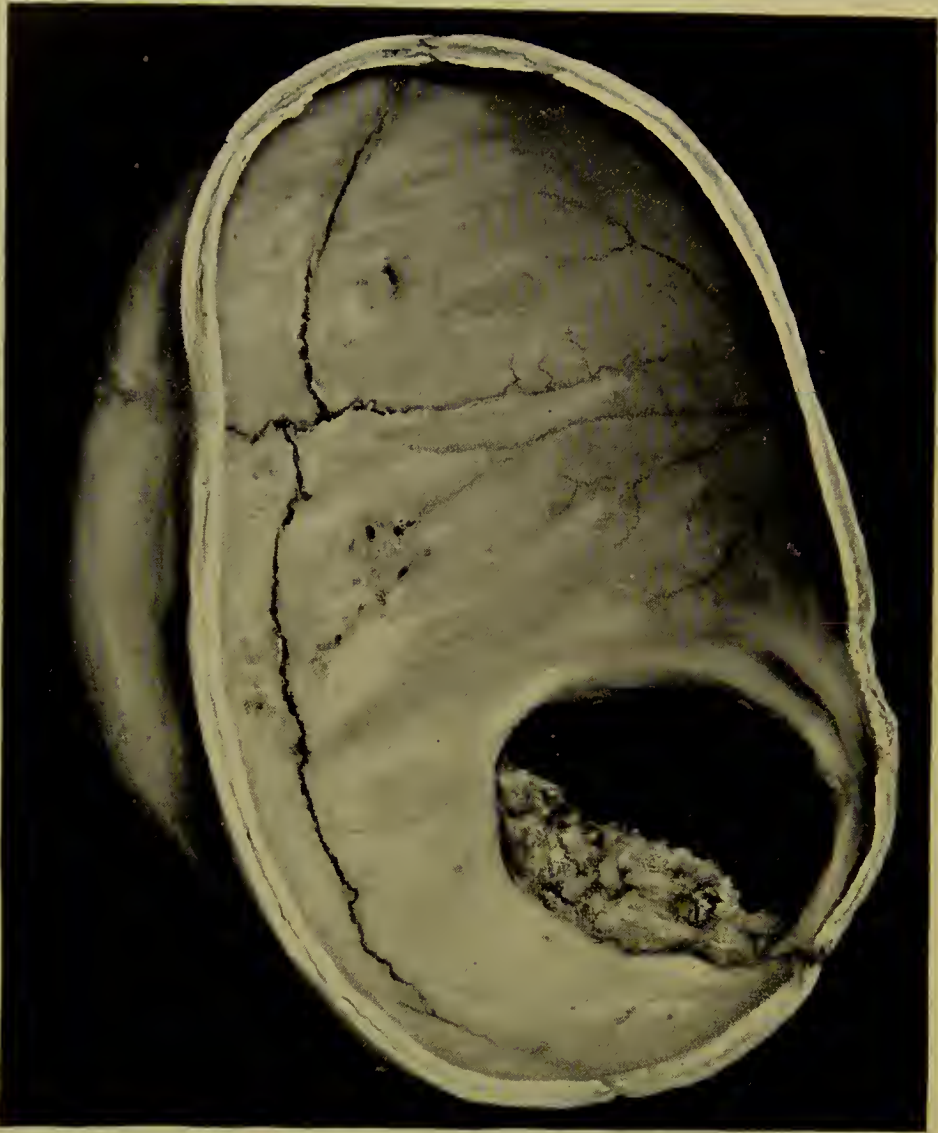


FIG. 5.—Destruction of internal table, without involvement of external table.
Interior view of Fig. 4.

shows loss to the outer table; over the posterior half there is hyperostosis of the outer table, so that the skull is almost normal in thickness, notwithstanding the loss of the inner table.

At the autopsy the dura mater beneath the whole oval space was absent, and an abscess penetrated the brain to a depth of about two and a half inches. The meshes of the pia mater were everywhere infiltrated with pus. The perieranium was thickened over the opening in the skull;

the other tissues of the scalp were normal. The clinical history of the case was clear; the patient had a chancre in early life, but the date at which the tertiary symptoms appeared was not given. The cause of death was abscess of the brain.



FIG. 6.—Superficial destruction of portions of the bones of the skull and face.
Acquired syphilis.

Fig. 6, also from the Pathological Museum, New York Hospital, shows another skull, in which the destruction of tissue is mostly confined to the external table; although at one point in the frontal bone perforation has taken place through both tables. In this case the anterior alveolar process of the upper jaw had disappeared, and there were two large perforations through the palatine processes of the superior maxillæ. The anterior arch of the atlas and the body of the axis had been partially destroyed,

and the two vertebræ are firmly ankylosed to each other and to the skull by the articular processes.

Fig. 7 illustrates the exostoses of the skull found in cases of hereditary

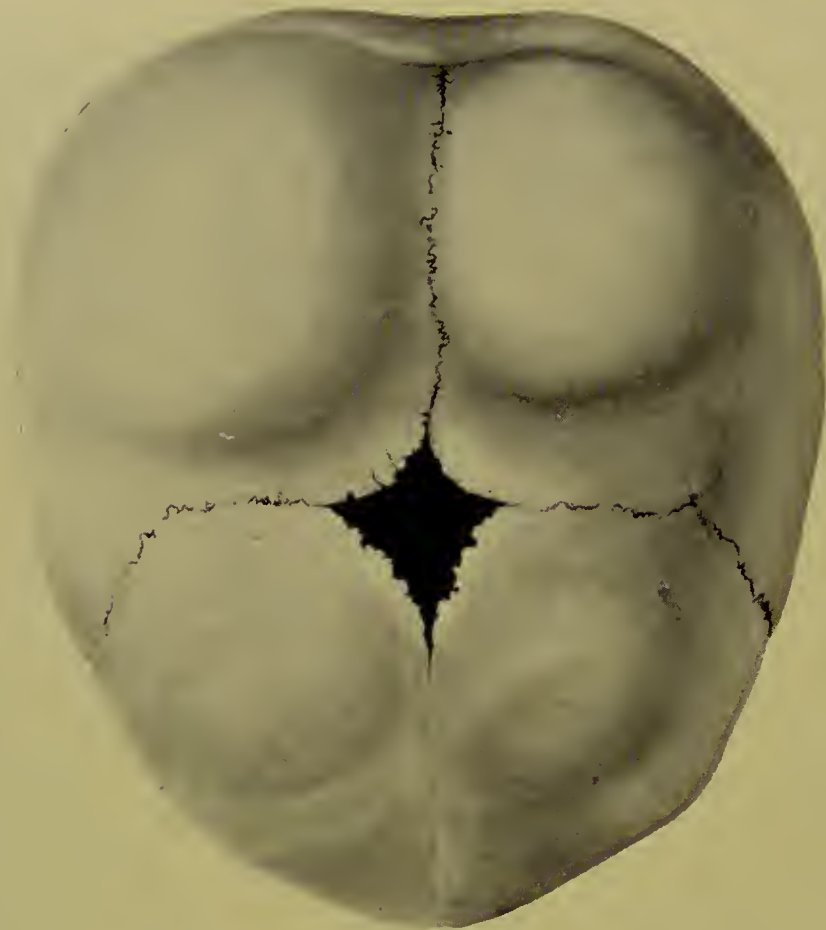


FIG. 7.—Exostoses of skull. Hereditary syphilis. (After Parrot.)

syphilis, and is taken from Parrot's work. These exostoses are often spoken of as *Parrot's nodes*, and are very constantly found in the inherited form of the disease.

ACQUIRED SYPHILIS.

In acquired syphilis bone lesions are most frequently seen in the tertiary stage, although they may occur in the primary or secondary.

Primary Stage.—In the primary stage the bone lesions are rare; although Swediaur says that they have been observed as early as the fifth day after the appearance of the chancre, instancing a case of a node of lower end of ulna, and Mauriac reports several cases where the bone symptoms appeared before the skin lesions usually spoken of as characteristic of the second stage. The skull is the part most frequently affected, and

the lesion consists of a periostitis, usually mild in character and readily cured.

Bone lesions in the early stages most frequently occur between the fifteenth and the one hundred and twentieth day after the appearance of the chancre, and may constitute the first symptom suggesting systemic infection. Although yielding promptly to treatment, they are apt to recur. From the standpoint of prognosis early bone lesions may indicate that the disease will be severe in character. Suehanek states that in Prague bone syphilis has been seen in seven cases out of one hundred during the primary stage. Mantegazza has seen in South America bone lesions and destruction of the nose almost immediately after the appearance of the chancre and before its cicatrization. Other observers, however, consider these instances as exceptional. The following history, from Mauriæ, is of interest :

Periostitis of frontal bone, appearing thirty-four days after the chancre, four days before the appearance of the roseola. Periostitis of right internal malleolus, two days after the periostitis of frontal.

Male, thirty years of age, in good health prior to this attack.

February 1, 1885.—Chancre.

March 3.—Extreme headache, fever, and sweating at night. No sign of general infection. Ordered the iodide of potassium.

March 6.—Despite treatment, a node appeared on left side of the frontal bone.

March 8.—Periostitis of right internal malleolus.

March 10.—The thirty-fourth day after appearance of the chancre. The periosteal tumor much increased in size. Appearance of the roseola. Under proper treatment the patient made a good recovery.

Secondary Stage.—In this stage the bone lesions are occasionally met with, perhaps more frequently than recorded cases would indicate, as we can not always make the same distinction between the secondary and tertiary that we can between the primary and the secondary. In fact, the secondary and tertiary symptoms may appear almost simultaneously. An interesting case of acquired syphilis where these conditions existed is the following from Mauriæ: A child two years of age contracted a specific sore on its upper lip from kissing its mother; following this there appeared a roseola and mucous patches on the vulva and anus, multiple exostoses and gummata on the frontal bone, and swelling on lower and inner sides of the humeri, all of which readily yielded to proper treatment. According to Popescu, the different parts of the bony skeleton most frequently involved are:

Frontal bone.....	27.9	out of	100.
Tibia.....	16.3	“	“
Ribs.....	13.9	“	“
Parietal.....	9.3	“	“
Other bones.....	7.9	“	“

Tertiary Stage.—In this stage bone lesions are frequently found. Jullien states that the relative frequency of symptoms in the tertiary stage is :

Affections of the skin	54·3 in 100.
“ “ bones.....	27·7 “
“ “ testicles.....	11·3 “
“ “ nervous system.....	8·3 “

The average date of appearance has been found to be four and a half years after the initial lesion in a series of two hundred and eighteen cases. The bones may be affected as a first symptom in the tertiary stage or after the other organs.

The tertiary stage may appear very late after the chancre. Fifteen, twenty, and even more than fifty years may elapse, and one case is recorded where seventy-three years intervened, between the chancre and the appearance of the bone lesions. The effect of treatment has an influence upon the date of the appearance of the bone disease. In cases where mercury had not been used the average date was three years and nine months after the initial lesion, as compared with four years and six months in those to whom mercury had been given. The effect of treatment of syphilis in its early stages also has an influence upon the relative frequency of the osseous symptoms. Where mercury was given *ab initio*, we find bone lesions in twenty-one cases out of one hundred ; where mercury was given upon appearance of some of the secondary symptoms, in twenty-three cases out of one hundred ; and where no mercury was given, in twenty-eight cases out of one hundred. As to the relative frequency of the different bones affected, Jullien gives :

	Cases.		Cases.
Nose.....	19	Clavicle and maxillæ, each.....	2
Tibia	15	Frontal.....	1
Palate.....	15	Parietal, vertebræ, each.....	1
Sternum.....	15	Scapula, ulna, and patella, each	1

The character of the lesions was :

	Cases.		Cases.
Necrosis.....	20	Osteitis and periostitis.....	12
Exostosis.....	15	Circumscribed gummata.....	11

Virchow, among other observers, believes that traumatism plays an important rôle in the production of the osseous lesions. Most of the bones affected are situated near the surface and are liable to bruises or contusions, and as such injuries are common it is possible that too much importance has been ascribed to this cause. The influence of other diseases in producing bone lesions is probably very slight, although any disease that lowers vitality may occasionally be the cause of tertiary symptoms appearing earlier, and may increase their severity.

In acquired syphilis gummata may form on any of the bones ; but it was seen by the tables of Jullien and Popescen that the most frequent sites were the cranium, face, and tibia. In the skull the periosteum is usually the first tissue involved, and either the external or internal table may subsequently be affected. If the internal table alone is diseased nothing may be detected by external examination, but the patient may have symptoms due to pressure, such as pain in the head or along the course of the nerves passing by the affected portion. If situated near the ear, there may be deafness ; if near the eyes, interference with vision.

When the bone is involved loss of substance usually results. This loss may be slight, and around the site new bone may be formed, or a large portion of the skull may be necrosed and disappear, as in Figs. 4 and 5. The superficial losses of substance may be serpiginous in character or in the form of rings or half circles, often resembling in shape some of the skin lesions.

The bone affection may also be secondary to gummata in the dura mater or scalp, although the latter is rare. In some cases exostoses may form and permanently remain, but bone lesions affecting the skull are prone to degeneration. The same is true of the bones of the face.

The nasal bones when attacked by syphilitic disease nearly always necrose, and as a result loss of the bridge of the nose occurs, with the production of the peculiar deformity of flattening of the upper portion and prominence of the lower portion of the nose—a sunken nose. In some the soft parts are not involved, except the mucous membrane of the nose, but this always results in a more or less offensive ozæna. It is rare that only one bone is diseased, for, in addition to the specific infection, there are present in most instances the bacteria of inflammation.

Great destruction of the soft parts frequently ensues, and this will increase the resulting deformity. From the nasal bones the disease may extend backward and involve the ethmoid and the bones of the skull, or downward and attack the palate and parts adjacent, or it may even extend to the vertebræ. The amount of tissue destroyed varies much in different individuals, and largely depends upon the time at which proper treatment is begun.

Fig. 8 illustrates the loss of the bridge of the nose, and in this patient the entire cartilaginous septum is also wanting. The patient is a female, aged forty-two, married seventeen years ; denies any specific history ; husband examined, but with negative results. Seven months after marriage had a miscarriage ; one year later a stillbirth at full term. Her third child died during the first year of life, cause unknown. Her oldest child, a boy of fourteen, has syphilis affecting the throat and parts adjacent ; the next, a girl of twelve, has bone lesions of tibiæ and humerus. These two cases are reported under the head of hereditary syphilis. A

baby of one year and a little girl of three seem perfectly healthy. Woman denies any disease until three years ago, when, she says, a discharge appeared from the nose; this increased, and the nose, which was perfect until that time, gradually lost its shape and finally became flattened, as at



FIG. 8.—Destruction of nasal bones. Sunken nose. Acquired syphilis.

present. She was treated locally and by internal medication, and at the end of a year the disease was arrested. The primary lesions were evidently overlooked, and the tertiary bone symptoms appeared about fourteen years later.

Many interesting examples of syphilis of the bones of the face have been reported, one of the most striking being related by Trousseau in his *Lectures on Clinical Medicine*, wherein he speaks of an English officer who had a sudden suffocative attack caused by the presence in the nares of a foreign body which had subsequently fallen into the throat. During the seizure he drew forth a large, irregularly shaped and rough edged

piece of the ethmoid bone. The disease, however, subsequently extended to the brain, and the patient died with cerebral complications.

Gummata appearing on other bones are not so prone to cause losses of substance, and usually form tumors more or less firm. Under appropriate treatment, if seen before they have become bony in character, they may entirely disappear, otherwise they simply diminish in size or are not changed. They are apt to affect more than one bone, and may follow each other in rapid succession, as in the following case :

Male, aged thirty-eight, applied for treatment on account of pain in spine and loss of motion in right knee, supposed to be rheumatic; admits having had chancre and roseola. Over left sterno-clavicular articulation is a swelling, size of a small hen's egg, tender on pressure. This tumor, he says, has been larger. Is ordered iodide of potassium internally, and mercurial ointment to be rubbed daily, alternately upon the arms and legs.

Is seen three months later, and reports that under the treatment the symptoms diminished in severity, and he soon discontinued the use of the medicine. He now presents, in addition to the original node, one on the left scapula about the size of a large marble, and one over the junction of the first rib and the sternum slightly larger, and a small one on the left clavicle.

When the vertebræ are involved there may be present a characteristic deformity and all the symptoms of Pott's disease, but in no sense do such symptoms vary from those of tubercular origin. In other cases exostoses may occur either on the posterior portion of the column or in front of the vertebræ, where, if on the upper cervical, they can be felt through the mouth. They may produce pressure on the cord in the central canal, cause myelitis and destruction of the cord, or by pressure on the œsophagus produce dysphagia, or if on the respiratory tract, asphyxia. Levot, in a thesis on syphilitic affections of the spinal column, tabulates seven cases of exostoses and hyperostoses, three cervical, three dorsal, one lumbar; and of osteomyelitis and necrosis, nine cases in the cervical region, three in the lumbar, and one in the sacral. One reason for so many cases in the cervical region is that the disease often extends from the facial bones or from the soft parts in the palate.

Exostoses on the sternum may cause severe pain and give rise to pressure symptoms. The pain may be referred to the heart, to the respiratory tract, or to the region over the bone or near it. Angina, asthma, and other troubles may result, and statistical tables show that this bone is often affected; and care should be exercised, in cases where pain is complained of in this region, to carefully examine the sternum, especially if there is any suspicious history of a previous syphilis. Where the exostosis appears upon the under surface rarely can anything be detected by external examination, though tenderness on pressure may be elicited.

Of the long bones the tibia is most often affected; on its crest are found exostoses, or, when the entire length is involved, hyperostosis. So

large an area of the surface of this bone being subcutaneous, it is extremely liable to external violence, with resulting necroses. If there is a coexisting syphilitic disease, the soft parts over the injured area break down, and an ulcer forms followed by a cicatrix. If the shaft is involved, sequestra may be formed, and as a result of a formative osteitis they may become completely surrounded by new bone. The part most frequently affected is the anterior portion of the shaft, and but rarely either extremity. This fact is of interest when compared with tubercular disease.

Elliot (Journal of Cutaneous and Genito-Urinary Diseases for January, 1893) has reported five cases in which he found nodes situated on the hyoid bone, associated or not with chondritis or epichondritis of the thyroid cartilage. The patients referred their pain to the region of the throat in general, and suffered most inconvenience in swallowing, talking, or making movements of the head or neck. No lesions were found in the larynx or pharynx, and when proper treatment was applied the nodes disappeared and the inconvenience ceased.

INHERITED OR HEREDITARY SYPHILIS.

In this form of the disease the bones are more commonly affected than in the acquired form. Fournier's statistics of late hereditary syphilis show that, of two hundred and twelve cases, eighty-two were of the osseous system, a proportion larger than is found in the tertiary stage of the acquired disease. There are several reasons for this excess. Prior to adult life the bone tissue is in a formative condition, and in very early life it is embryonal and more susceptible to pathological changes; and in many instances of syphilis appearing in the newborn no treatment has been given to the child, and often none to the mother.

Under the head of acquired syphilis reference was made to the effects of treatment in relation to the time of the appearance of the bone lesions, and the same is true here. The value of treatment is especially seen in pregnant women, for under the use of antisymphilitic remedies many who have repeatedly miscarried may be delivered at term and the children show no lesions. The time at which the bone symptoms appear varies; the infection occurring *in utero* may be so great that miscarriage or stillbirth is the result, or the child may not show symptoms until some time after birth.

Eduard Krauss (Archiv für Kinderheilkunde, ix, p. 81) out of three hundred and sixteen cases of syphilis, found sixteen involving the osseous system. Of these, eight occurred during the second month of life, one during the third, two during the fifth, one during the sixth, one during the eighth, one during the ninth, one during the tenth, and one during the second year.

Parrot has reported cases of stillbirths where the bony lesions were

found ; other cases have been reported in children of three weeks of age ; but the greatest number are seen during the first six months of life. Between the second and fifth year the disease is rarely seen, as compared with later periods.

Fournier's statistics give : From the third to the fifth year, five cases ; from the fifth to the twelfth year, fifty-four cases ; from the thirteenth to the nineteenth year, twenty-four cases ; from the nineteenth to the twenty-eighth year, seven cases.

These show a very large proportion between the fifth and nineteenth years. Whether the disease may appear later than the twenty-eighth year is doubtful. In some instances hereditary syphilis may exist and yet no symptoms be noticed, and autopsies may determine the presence of lesions that were not suspected during life. Gangolphe reports several such cases in which, probably, had the patients lived longer, symptoms would have appeared, as the lesions consisted of gummata in the bone proper.

As a rule, in young children, when osseous lesions exist, other symptoms are also present, and it may be assumed that the disease is still active, although the author has seen cases where the bones alone seemed to have been involved. Mothers are, however, not always close observers, and the mere statement by them that the child has never had other symptoms is not proof positive. Active and severe forms of syphilis in the mother usually produce similar conditions in the child, including the osseous lesions ; but a remote source of infection and a mild form of the disease in the mother is not necessarily followed by a light manifestation in the child. Of eleven cases reported by Taylor, the mothers of three children had been syphilitic fully two years ; one was at the end of the first year of syphilis, three were infected at the fifth month, and two became syphilitic at time of conception.

When the severity of the bony lesions in the child are considered, it is found that the earlier the mother was infected the more severe are the lesions. Although the lesions of the children whose mothers had been syphilitic for two years were rather extensive, they showed no tendency to degeneration, and had the mothers been treated the results might have been different, for in all these cases there was no treatment, or it was very inefficient.

Whether the disease occurs soon after the birth of the child or later in life it presents a predilection for certain bones and for certain portions of these bones. In very young children we find most frequently affected the bones of the skull and the long bones, such as the humerus and tibia.

In later life Fournier gives : Tibia, ninety-one cases ; ulna, twenty-two ; radius, fifteen ; humerus, twelve ; femur, eight ; fibula, four ; clavi-

ele, five; bones of the skull, sixteen; other bones, twenty; total, one hundred and ninety-three cases.

The tibia is affected in nearly half of all the cases, and these one hundred and ninety-three examples were seen in sixty-nine patients—which is a matter of diagnostic importance, as the symmetrical affection of bones, or the involvement of several bones at or about the same time, is highly suggestive of specific osteitis.

Hereditary syphilis, when it affects the skull, may produce ulceration, in which only the external table may be implicated. The parietal, frontal, and occipital bones are those most frequently diseased, and in the order named. The cases where loss of substance includes both tables are rare. The bone may be destroyed at the side opposite to the decubitus, and the left side is said to be affected more often than the right. When formative osteitis occurs about the site of the disease it gives to the skull a peculiar roughened appearance, the result of depressions and elevations.

The most frequent changes, however, are osteophytic in character; in the very young the inner table is most often involved, in later childhood the outer table. The osteophytes produce various changes in the skull. They develop along either side of the sutures, and from the osteitis that often results premature ossification may occur, and thus asymmetry of the skull be produced. Parrot terms these skulls *natiform*, and considers them pathognomonic.

An excellent illustration of these osteophytes or exostoses is seen in Fig. 2. When the parietal bones become prematurely united by new bone, a band may form across the fontanelle and thus form a cross. Craniotabes may also be found. As the children grow older the bony tumors of the skull are not so often seen, and in late hereditary syphilis the skull is rarely affected.

The symptoms of formative bone changes in hereditary syphilis of the skull are the same as in the acquired form. Headache, deafness, hemiplegia, and symptoms of meningitis may all follow, but when the external table alone is involved the symptoms produced may be very trifling in character.

In very young children the lesions are essentially degenerative in character when affecting the long bones, and are in many cases rapidly followed by abscesses; these may burst into the neighboring joints and be the cause of an acute arthritis, or the periosteum may be lifted up for some distance, the abscess finally coming to the surface. As referred to in the pathology, mixed infection is present, and when it is considered that gummata frequently coexist in various viscerae the great fatality of the disease is easily accounted for. In later life destruction of tissue is comparatively rare, except when gummata of the periosteum, or just beneath it, break down.

The tibia is the bone most often affected, and may be the seat of one or more exostoses, as in Fig. 11. On this girl there were cicatrices and active destructive skin lesions about the left knee, but the bones affected showed exostoses only, the right leg having two distinct elevations on the crest of the tibia, the left leg one.



FIG. 9.—Exostosis of lower end right humerus. Hereditary syphilis.

The patient, a female, came under observation in August, 1892. She was then twelve years of age. Family history negative. No opportunity given to examine the parents. The mother reports two miscarriages prior to the birth of this child. The patient was in good health until she was eight years of age, at which time she began to have pains in her tibiae. Enlargement of these bones was noticed about this time, and increase in size has taken place gradually ever since. A few months prior to the application for treatment a swelling of the right arm was noticed. Examination showed a slight enlargement, probably bony, situated at the upper third of the ulna on its posterior border. Pressure gives pain. The right tibia is enlarged for nearly its entire length,

almost a condition of hyperostosis, and shows thickening of its anterior border. At its middle third there is a well-marked prominence, and at its lower third a smaller one. About the center of the upper exostosis is an old cicatrix circular in form. The left tibia is the seat of a well-marked exostosis about the middle of the shaft. Both the tibiae are painful on pressure. Over the left patella



FIG. 10.—Hyperostosis of left tibia, exostosis of right. Hereditary syphilis.

there is a large ulcer affecting the skin only, irregular in outline, and measuring two by four inches. In the popliteal space of the same leg there is another ulcer, red and angry in appearance, with thickened edges, and measuring three by four inches. Both ulcers discharge slightly, and show no tendency to granulation. The teeth are notched. No epitrochlear enlargement. A diagnosis of syphilitic osteitis being made, the patient was given

twenty grains of iodide of potassium and one twentieth of a grain of calomel three times a day. This dosage was gradually increased. The ulcers were dressed with iodoform gauze. Examination of the patient in the following October showed complete healing of the ulcers, but no diminution in the bony enlargements. The girl eats and sleeps well, and is entirely free from osteo-



FIG. 11.—Exostoses of tibiae. Hereditary syphilis.

topic pains. Tibiae not painful on pressure. This patient was seen again in January, 1893. She had neglected to take her medicine of late, the pains had returned, and two large ulcers had formed over the crest of the left tibia—the upper one affecting only the skin, the lower one going down into the muscular tissue.

Striking examples of hyperostosis and exostoses are seen in Figs. 9 and 10.

The patient, a female, aged eleven, was first seen in July, 1892. Her father denies syphilis, and shows no signs of ever having had the disease. Mother was syphilitic, and is the case referred to in Fig. 8. An elder brother has hereditary syphilis. This girl was perfectly well until eighteen months ago, when she began to have pain in the tibiae. She went to a dispensary and was treated by inunctions and internal antisyphilitic remedies. Noticing very little improvement, she discontinued the treatment, and for the past year has taken no medicine. Her general condition is fair. Just above and both in front and behind the right ear are several cicatrices, the results of gummata that have broken down. These she declared were open ulcers when she first applied for treatment eighteen months ago, and that after taking medicine they healed quite promptly. On the lower and outer side of the right humerus is a firm, oval swelling, about one inch in length by three quarters of an inch in width. The measurements of the two arms at this point are: Right arm, seven, seven and a half, and seven inches; the left arm, seven, six and three quarters, and six and a half inches. These measurements are taken one and a half, one, and a half inch above the elbows, and the exostosis is represented in Fig. 10. The left tibia is thickened for its entire length in front and is bowed forward, showing hyperostosis; the edges are uneven, but there is no marked projecting point. The greatest thickening is about the center. This deformity resembles the condition spoken of by Fourmier as the *lame de sabre*, or sword-blade tibia. The right tibia is increased in size, forming an exostosis, and this is especially noticeable just about its upper third. The left is one and a quarter inch larger

than the right just above the ankle. In this bone we see a marked change from the normal. The crest of the tibia is not sharp or narrow, but broad and thickened, and for its entire length is bowed forward. There is a slight fullness about the ankle, and both the feet are in *valgus*, the patient having well-marked, flat feet. The tibiae are painful on pressure. Over the middle third of the tibia is a circular scar the size of a dime and brownish in color. She says no dead bone has ever come away. The patient suffers much from pain, sleeps very poorly, and on account of her flat feet walks with difficulty. The teeth are normal and perfect. All superficial glands of the body are enlarged.

She is given the iodide of potassium internally, and her flat feet corrected by building up the inner side of the shoes—Thomas's method. The patient reports regularly, and in December, 1892, she is found to be very much improved. She can walk better and farther, and eats and sleeps well. The pains in the tibiae have disappeared, although the size of the bones is unchanged.



FIG. 13.—Rachitic tibia.

This broadening and thickening of the anterior surface of the tibiae, with bowing forward or outward, is very characteristic of hereditary bone syphilis, and is very different from the bowing of the bones seen in rachitis. In them the bone, although bowed, is not thickened, but is usually much thinned, the crest of the tibia in some

PLATE XIX.



HEREDITARY SYPHILIS.

cases being unusually sharp. Fig. 13 illustrates very well an anterior curvature due to rachitis. Compared with the long bones, the bones of the skull and face are rarely affected in late hereditary syphilis. When this is the case the disease often extends from the soft parts, and the bones may be affected secondarily, as in the following case kindly furnished me by Dr. Meierhof :

The patient, a boy of fourteen, the eldest brother of the case referred to in Figs. 9 and 10, has been under treatment for eighteen months, and in spite of all that has been tried the disease has steadily progressed. All forms of antisyphilitic remedies and tonics have been tried, but with no great beneficial results. In December, 1892, his condition was as follows : The nasal mucous membrane was in a state of chronic hyperæmia, accompanied with a thin discharge, which excoriated the nostrils. The posterior third of the palate, including the soft and hard parts, had sloughed away ; and also the posterior wall of the pharynx for almost its entire width and length, down to a level a little below the epiglottis, had been destroyed, and above the post-rhinal space is exposed, including the base of part of the sphenoid bone. The larynx exhibits a thickened and somewhat distorted epiglottis, although there are no evidences of ulceration at present. If the spread of the disease is not checked and the patient survive, the borders of the upper cervical vertebræ will be laid bare and those parts affected.

Plate XIX illustrates how extensive the lesions of the bones of the face may be. For the history and the privilege of reporting the case I am indebted to Dr. L. Duncan Bulkley.

The patient was a male, aged twenty. Nothing is known of his father. The mother had syphilis. The boy was perfectly well until he was nine years of age, when a small pimple appeared on his left cheek. This was followed by an ulcer, which gradually extended over the entire face, destroying the nose and extending up over the eyes and over the frontal bone. He has been blind for five years, except that he can distinguish light from darkness. The anterior portion of the scalp appears as a cicatrix. The forehead is of cicatricial tissue, and a thin layer of the same tissue spreads over and covers in the left eye. Through this film of tissue the eye can be seen, with its partially opaque cornea, and it is through this he distinguishes the light and the darkness. The right eye appears as a prominent, bulging mass, through which no light can be seen. The nose is wanting, its site completely closed in by scar tissue. The upper lip presents a cleft in the center, exposing the upper teeth and gums. The soft palate and uvula have been destroyed, and the lower lip is so drawn to the left that the corner of the mouth is depressed below the gums, and there results a constant dribbling of saliva. Upon the right wrist, there is an extensive ulcerous surface nearly encircling the member, and leaving only a small bridge of skin upon the ulnar border. The ulcer is about four inches in length and in a very unhealthy condition, having been previously only dressed with mutton tallow. The bone in this situation is exposed, and the patient says a few weeks ago a small piece of bone came away. The joint is stiff, and the hand drawn toward the ulnar side. The fingers can only be moved with great pain. Upon the left leg is another ulcer. Mixed treatment was applied,

and three years later, when the photograph was taken, the ulcers had all healed, the sight slightly improved. But very little more can be expected, as the destruction of soft parts is so great as to preclude any successful plastic operations.

The vertebræ are rarely affected in hereditary syphilis. In cases, however, where multiple bone lesions exist it is always well to carefully exclude this cause for the spinal lesion, if possible. The author has only seen one case of Pott's disease that he felt warranted in ascribing to syphilis alone. As a rule, these cases are tubercular, or the syphilis and tuberculosis both exist. The patient referred to was a boy six years of age; the father was not seen nor examined, and the mother showed no evidences of syphilis. The child had snuffles and roseola as a baby, and when five years of age developed an osteitis of the bones on the inner side of the right foot. Under the free use of iodide of potassium this entirely subsided in a short time, and when first seen for his spinal difficulty the boy was about four years of age. He had pain in the back, and a slight projection posteriorly of the mid-dorsal vertebræ. There was a firm cicatrix over the inner side of the foot; no pain or lameness. A brace was applied, and the iodide continued. He did remarkably well for a year, when the mother neglected to give his medicine and to keep the brace properly adjusted. The swelling on the inner side of the foot returned, the pains increased in the back, and he has again begun active and proper treatment. In this patient the osteocopic pains were marked, and much worse at night. An interesting fact in connection with this case, which was referred to the Hospital for the Relief of the Ruptured and Crippled by Dr. Bulkley, was that the grandmother had syphilis, and this child's disease might have been acquired from her.

The multiplicity of the lesions is interesting, and, as previously remarked, may be an aid in diagnosis. The author has recently seen a case of Dr. Koplik's, a child two years of age, with a cicatrix leading to bone on the lower end of the right humerus, and a gumma on the lower end of the left one, gummata on the lower and upper ends of the right ulna, and one on the lower end of the left, cicatrices on the upper ends of both tibiæ, and two gummata on the right tibia. All these were of the size of a large marble. At the junction of the web of the forefinger and thumb on the right hand was an ulcer where a gumma had broken down.

Lannelongue has reported a case where nine different bones were affected at various times between the ages of five and eleven. A patient of Fourneau Jordan's had nine hyperostoses present on the skull. All the cases referred to in this article had more than one bone involved.

It will be deduced from these illustrations that the lesions produced in the bones in acquired and in hereditary syphilis, while not pathognomonic, are highly suggestive. The combination of rarefying and forma-

tive osteitis, followed by sclerosis and eburnation of bone, superficial losses of tissue surrounded by increased growth, the involvement of several bones at or near the same time, the predilection shown for the shafts of the long bones, for the bones of the skull and face, may in many cases lead to a probable diagnosis and suggest the proper treatment, although no positive history of previous syphilis may be obtainable. Tuberculosis and rachitis have probably no effect on the predisposition to bone lesions in syphilis, except in so far as they lower vitality and thus intensify any disease that may exist. Syphilis does not produce tuberculosis or rachitis, although the latter has been affirmed of rachitis by Parrot. His opinions on this subject are not accepted to-day by the majority of syphilographers, and each of his final conclusions has been disproved except the third. As the dispute is still *sub judice*, his views may be of interest. In a work entitled *La Syphilis héréditaire et le Rachitis*, published in 1886, this distinguished author's views are given as follows:

1. Rachitis is of syphilitic origin invariably, proved by the fact that the pathology is the same as that of the later stages of hereditary syphilis.
2. Rachitis, the last manifestation of hereditary syphilis, is not syphilis, but exemplifies a pathological change.
3. Patients affected with rachitis may contract syphilis.
4. By experiments on young animals we may produce lesions similar to those of syphilis, but not of rachitis.

His conclusions as to the pathology of hereditary syphilis are based upon the study of cases some of which are undoubtedly rachitic. He divides the pathological changes into four stages: 1, *periostogenèse*, which includes *osteogenèse* and *fibrogenèse*; 2, *medullogenèse*; 3, *chondrocalcosè*; and, 4, *transformation gélatiniforme*.

Periostogenèse is seen in the fœtus and in early life. The periosteum is thickened, more resisting, and adherent to the bone—it rarely ulcerates; after removal there are found osteophytes, which may be small or large, irregular or even in outline, adherent to the bone, of straw color, hard or friable, and exceedingly porous. The thickness may vary from very little to over three centimetres. Its most frequent sites are the humerus and tibiæ, generally on their lower two thirds. If the osteophytes have developed very early, the shape of the bone may be much changed; if late, there is very little if any change. The bone due to the increase in size is heavier; after the age of six months fibrogenesis occurs. The osteophytes becomes fibrous; a layer of fibers covers them, perpendicular to the diaphysis, of whitish or bluish color, adherent to the bone, and resembling tendon. The chondrocalcareous layer which separates the cartilage from the spongy tissue is slightly thickened.

Medullogenèse is the result of *periostogenèse*. Spaces arise between the diaphysis and the osteophyte. These are parallel to the shaft, and

broken here and there by trabeculæ which are the only vestiges left later on of the old bone or the osteophyte, as the process is a destructive one. It may only leave the external layer of the osteophyte, or the fibrous layer which covers it. The diaphysis may be attacked and its tissue destroyed. The bone is lighter and more porous.

Chondrocalcase.—In this stage the chondrocalcareous layer between the cartilage at the epiphysis and the bone becomes thickened. It may be regularly increased in size or only thicker in places, and may extend in the shape of numerous prolongations into the bone. This layer becomes very friable, and accounts for the fractures or separations of epiphysis from diaphysis. This layer is yellow in color, and only seen in very early cases. Rarely its color differs slightly from that of the spongy tissue of bone.

Transformation gélatiniforme is a more or less complete alteration of the spongy portion of the bone, and even of the osteophytes. It begins in tissue near the diaphysis, then affects the diaphysis, and lastly the chondrocalcareous layer. When general, the strength of the bone is affected and fractures may result. Its color varies from light cherry to a currant red, and it is of jellylike consistency. Parrot thinks rachitis rare before the sixth month of life. He lays down the differences between *sypphilis* and *rachitis* as follows :

SYPHILIS.	RACHITIS.
1. No spongy tissue.	1. Spongy tissue.
2. Osteophytic osseous layers.	2. Peripheric spongy layers.
3. Augmentation of the diameter by these layers.	3. Augmentation of the diameter due to spongy tissue.
4. Osteomalacia and decalcification hardly marked.	4. Osteomalacia and decalcification considerable.
5. Gelatiniform degeneration, which may lead to separation of epiphysis.	5. Never any gelatiniform degeneration.

As the sypphilis progresses these lines of demarcation become less well defined, and the distinctive points, although present, are not as well marked. This table shows them :

SYPHILIS.	RACHITIS.
1. Osteophytic layers with medullary spaces between.	1. No osteophytic layers.
2. Augmentation of the diameter from osteophytic layers and spongy tissue.	2. Augmentation of the diameter by spongy tissue only.
3. Bones flexible but less so than in rachitis.	3. Bones flexible.

It is not necessary to enter into very minute details to prove that the other propositions as laid down by Parrot are untenable, but a few will suffice. That rachitis can not be produced in animals is contrary to what is now known on the subject, for we know it to be a common disease especially in those confined in menageries.

That rachitis does occur in some cases of hereditary syphilis is undoubtedly true, but the syphilis certainly does not always cause the disease. Demme, in Berne, from 1862 to 1868 saw six hundred and forty-eight children affected with rachitis, and in no case was evidence of syphilis found.

Pini, of Milan, reports on 4,176 children affected with rachitis, and believes there is no connection between the two diseases. Syphilis exists in countries where rachitis is unknown. Humboldt failed to see any cases of the latter disease in Mexico or Peru. Waitz never found it in Java. Ernest Martin gives similar testimony as to China and Japan, and all these observers met with cases of syphilis among the natives of these parts.

Fournier, in discussing this question, says: "Agreeing in the main with the view taken by Parrot, that rachitis is frequently met with in persons affected with hereditary syphilis, I would differ from him in regarding it as an unfailing sign of syphilis. I believe that rachitis is the result of a general disturbance imported by syphilis into the organism; or, putting it in other words, that syphilis is a considerable affluent in the production of rachitis, but not the only one."

The superficial lesions of the bones may be caused by extension from the soft parts, and this is especially apt to occur on the skull and in the palate. A syphilitic ulcer destroys the soft parts over the bone, and as a result both the periosteum and the bone are denuded, and superficial necrosis occurs in this manner also; although only one bone may be affected at the onset, the process may extend through the soft parts and eventually several bones become involved. This is seen about the bones of the nose and face. In all such cases, however, the question of mixed infection comes in, and the secondary processes are nearly always due to the bacteria of inflammation. Where meningitis occurs after necrosis of the bones of the face it is usually due to a specific rather than to a purulent meningitis extending from the site of the diseased bone, although the latter does occur.

When the bone lesions are situated near the joints by extension, they may involve the articulations, and a secondary arthritis or synovitis occur.

The results produced by the disease vary with the bones affected, the amount of tissue involved, and the character of the lesion.

Superficial lesions, slight in degree, may leave no signs, or if the skin over the affected bone becomes involved there may be an ulcer, subse-

quent healing producing a cicatrix. If loss of tissue is great, marked deformities may occur, as is seen in the loss of the bridge of the nose, so frequent after the loss of the vomer and the nasal bones.

Again, by weakening of the bones by gummata, whether in the body of the bone or in the medulla, spontaneous fractures may occur which upon healing may cause deformity.

The addition of new bone in the form of exostoses may also alter the appearance of the parts. These new growths, by increasing weight and by encroaching upon the articulations or interfering with muscular attachments or muscular action, may also cause deformities, such as the flat foot in the case of hyperostosis of the tibia.

Syphilitic Pseudo-Paralysis.—This is a term used by Parrot and others to denote the inability to control muscular movements in those who have suffered, in the course of a syphilitic infection, a separation of the epiphysis from the diaphysis. There is no true paralysis; the muscles react to faradism and galvanism, and the condition is simply such as is found after fractures. The patient is unable to raise the affected limb, usually the humerus or the femur, and unless union again takes place there is more or less permanent disability, and finally atrophy from disuse, and subsequent loss of power in the muscles of the entire limb. The separation of the epiphysis from the diaphysis usually occurs in very early childhood, and when due to a gummatous osteomyelitis, for instance, may be unsuspected until the little patient shows by loss of power of the affected limb that something is wrong. Careful examination will show the true nature of the lesion, the false point of motion, possibly crepitus and shortening, the deformity, the pain, and the pseudo-paralysis.

An interesting case of this kind is related by Behrend and quoted by Sturgis in the *Archives for Pediatrics* in April, 1888:

The child came under observation in June, 1880, when eleven weeks old, with a papular eruption of the entire body and a pseudo-paralysis of the right arm. Fourteen days before, the mother had discovered the child's arm was painful on motion, but saw nothing abnormal about it. Examination showed that there was a separation of the epiphysis from the diaphysis of the lower portion of the right humerus. The child was emaciated, its face wizened and senile, and the panniculus adiposus was entirely absorbed. Sublimate baths rapidly induced recovery, and the child increased in weight. Six months later, without any apparent cause, swellings appeared suddenly in the middle of the left humerus and of the left femur, increasing the affected areas to double their normal dimensions and giving rise to great pain. Examination showed fracture of both bones. Splints were applied and mercurial baths given, and at the end of two and a half months the child made a perfect recovery.

Fractures.—In patients affected with syphilis fractures may occur either from a slight traumatism or from severe injuries. From the earliest times it has been known that syphilitic lesions of a destructive char-

acter weakened the affected bone. Older writers spoke of *ostcomalacia*, *fragilitas*, and similar diseases, as being caused by syphilis; but although this may be true, the majority of fractures are not due to such diseases. No special weakening of the entire bony system is found, but usually some local cause for the fracture. A case reported by Bryant (London Lancet, April 23, 1887) well illustrates this point:

The patient was a female, aged fifty-three, who had syphilitic ulcers on the sternum, the left shoulder, and the leg. In getting up from a chair she felt something in her leg crack, and was unable to walk or stand on the limb. On admission to the hospital there was marked enlargement of the leg beneath the ulcer. Above and below it the skin was clearly defined, dipping down along its margin. At the bottom was a piece of black necrosed bone. The bone was fractured exactly at the seat of the necrosis, and the sequestrum removed measured two and a quarter inches by one inch. The limb was put up in a plaster-of-Paris spica, and a good recovery followed.

Of course, where *mollities ossium* or *fragilitas ossium* exists, fractures are more likely to occur than in normal bone. A case reported by Marcellus Donatus, in 1536, is possibly one of osteomalacia due to syphilis. The patient, while throwing half an orange to some companions, sustained a fracture of the right humerus, which however united promptly; but subsequently, in reaching from the bed for a vessel near by, he sustained a fracture of the left humerus, which also rapidly united. The traumatism in both these cases was very slight, but we know fractures do occur from muscular action.

These fractures unite as perfectly and as rapidly as those in normal bone, especially if proper antisiphilitic remedies are combined with the local treatment. In all cases such remedies should be used although all active signs of the disease may have disappeared, for the rapidity and perfection of union may possibly thereby be increased. The callus in such fractures does not differ from that in nonspecific cases. Many such fractures have been reported and subsequent autopsies made, showing the above fact. The following case is of interest, and is by Tavernier, in *Les Annales de Dermatologie et Syphilis*, Paris, 1887, 2me série, viii, p. 177:

The patient was a female whose husband was syphilitic. She acquired the disease six years prior to her admission to the hospital. She had suffered from severe pains in the head and from skin lesions, but had been delivered of one healthy child. There was found, on examination, a node on her right clavicle, at the junction of the middle and inner third, the size of a hen's egg. On the middle third of the left humerus was a node of the same size as that on the clavicle, and on the lower end of the right humerus was a node, the size not given. She was treated from October 30th to November 10th; then, while turning a pillow, she broke the right humerus in its lower third. She was given appropriate treatment, and the arm rapidly united.

One year later she died of hæmorrhagic smallpox, and the autopsy showed the callus to be normal and the union perfect. The node on the right

clavicle had disappeared, that on the left humerus was scarcely perceptible, and that on the right reduced about three fourths.

Nonunion does not seem to be more frequent after fractures in patients affected with syphilis than in those not so affected, nor is delayed union common.

Diagnosis.—The diagnosis of bone syphilis has to be made after a careful examination of the bones involved and a thorough history of the case.

Pain is the one symptom of great value. It is usually nocturnal in character, at least it is always worse at night, except in rare instances. In some cases the pain is almost unbearable, in others it is comparatively slight. The pains have been spoken of as “osteocopic,” and by many are supposed to be due to the warmth of the bed, for they may often not be felt until the patient retires. In the cases of those whose occupation is night-work the pains may be felt when the patient is in bed—that is, by day only. The rule, however, is, that although the pains may be more severe after the patient has retired, they are not entirely relieved by his rising during the night, and only diminish markedly in severity with the advent of another day. The pain may affect the entire length of a long bone, or the entire surface of a flat one; but as the disease comes nearer to the surface, in cases which go on to suppuration, only the part affected is the seat of the severe pain, although the entire bone may be painful.

The character of the pain has been variously described. Some say it is as if heavy blows were being given the limb, as with a hammer or some other blunt instrument. It is usually deep-seated. When it is so severe as to cause much loss of rest, unless the patients sleep by day, other symptoms may follow, such as weakness, nervousness, and disturbances of digestion. As a rule it is increased by pressure, but in exceptional cases this is reversed. By manipulation we may sometimes determine at just what point the disease is most active, for the pain is generally a very early symptom, frequently appearing before any increase in the size of the bone has been noted.

In cases where disease of the bones of the skull is limited to the inner table the pain may be the only symptom; and where we meet with patients suffering much pain, nocturnal in character, we should always carefully examine for any specific disease. When the nerves are pressed upon the pain may be felt at some distance even from the skull. In hereditary syphilis in very young children pain is not as valuable a symptom as it is in adults; although present, it is probably not as severe. The pain due to the involvement of the soft parts when abscesses form may be very severe in character, but is different from the osteocopic pains. The effects of treatment are first seen in the diminution of this symptom.

The *constitutional symptoms* vary with the age of the patient. In hereditary syphilis of young children, although at birth the child may appear healthy and well nourished, when bone disease appears the child becomes peevish and irritable, loses flesh, may refuse to nurse, sleeps poorly, and has a wizened and prematurely aged appearance. Usually at or about this time other symptoms appear. Mucous patches may be seen about the mouth; there are eruptions on the face or the skin of the body, and eye symptoms may be noticed. The liver and spleen become enlarged, and the various superficial glands are also increased in size. A thin irritating and ichorous discharge occurs from the nares, known as the "snuffles." If suppuration occurs, the temperature may be raised, and we have the usual signs of inflammation at the site of the lesion. In later life the constitutional symptoms are less marked, the liver and spleen are not as constantly enlarged, and other symptoms have usually preceded the bone lesions.

The *previous history* of each parent must be investigated as well as that of the child. If syphilis is admitted by either parent as having existed prior to the birth of the child, and the bone lesions are of the character met with in that disease, a diagnosis is easily made; but where syphilis is denied, what other symptoms of importance exist? Among the most important are miscarriages by the mother, for so frequently is syphilis a cause of nonviability and premature delivery, that whenever a woman repeatedly miscarries or gives birth to a dead child suspicion of this disease may be justly entertained. Carpenter states that, of six hundred and fifty-seven syphilitic females, two hundred and thirty-one miscarried, while four hundred and twenty-six were delivered at term of living children.

Kassowitz asserts that one third of all children procreated of syphilitic parents are stillborn, and that thirty-four per cent of those born living die within six months.

Miller analyzed one thousand cases, and found sixty-four per cent of the mothers miscarried during the first month, and twenty-two per cent during the second. Other statistics could be quoted giving corroborative data. The previous family history should be carefully considered. Iritis, deafness, loss of hair, sore throat, osteoepic pains, eruptions on the skin, are severally and collectively factors, the importance of which should be fully appreciated in doubtful cases.

Where bone lesions appear after the fifth year of age it should be remembered that other symptoms have usually entirely disappeared, perhaps leaving no trace of their pre-existence, and details as to previous symptoms must therefore be carefully sought for.

The Teeth.—Hutchinson, in 1863, described certain abnormal conditions of the teeth in patients affected with hereditary syphilis, and stated

that these changes were more marked and constant in the permanent than in the temporary teeth.

A careful study of the pathological processes is important, for, although the conditions are not pathognomonic, they may be of great aid in diagnosis in doubtful cases.

Dentition is found to be delayed, or the character of the teeth changed, or the teeth may be smaller than usual. Demarquay has recorded cases of syphilitic children in whom the teeth had not appeared at the fourth year; and Laneereaux describes a case where at twelve years of age the lateral incisors and canines had scarcely emerged from the alveoli; and Fournier says they may not appear until the fifteenth year. The teeth, then, in the syphilitic appear later than usual. The characteristic Hutchinson teeth, however, have their structure changed by erosions, causing a notching of their free edges.

The Eyes.—Existing disease of the eyes must be carefully examined, as it may constitute a useful factor in diagnosis. Opacities, iritis, retinitis, and ulceration of the eyelids may all be caused by syphilis, and, although active symptoms may not be present, an inquiry may elicit the fact that they have previously occurred.

The Ear.—Affections of the ear are frequent in hereditary syphilis, and where suppuration has occurred, followed by perforation of the tympanum, examination will reveal the previous lesion, and the deafness which may be present will also be suggestive.

The Skin.—If any eruption is present at the time of the examination usually by its character and its appearance it can be decided whether it is due to syphilis or not. If the eruption has disappeared, it may have left traces of its previous existence, and we should endeavor to ascertain, as nearly as possible, its character. If pigmentation of the skin remains, or scars are found, their nature and extent must be considered.

The Mouth, Nose, and Throat.—All these should be carefully examined for any signs of active disease, or for cicatrices suggestive of specific trouble.

Arrest of Development.—This is a symptom occasionally found in those suffering from hereditary syphilis. The patients may look younger than they really are, and in addition may be poorly developed, mentally as well as physically. In the female the genitals may be small or atrophied, the mammae but slightly prominent, menstruation delayed, and the growth of hair on the mons veneris and axillae very slight.

Effects of Treatment.—The exhibition of mercury and of the iodide of potassium will often assist toward making the diagnosis. Though these drugs do in some instances act favorably on tuberculous and other lesions, their effect is usually not as rapid or as well marked as in cases of syphilis. Still, too much reliance must not be placed upon the therapeutic

tie test, and if recovery fails to take place at once under antisiphilitic remedies the physician must not too hastily assume an error in diagnosis. Then, again, when local lesions have been improved, as in cases of ulceration of the soft parts and the bone, by proper cleanliness and surgical treatment the change must not be ascribed to the antisiphilitic remedies instead of the local management of the case. While the remedies are being given in doubtful cases, it is well not to conclude too hastily, because the patient improves, that the disease was syphilis.

Other Symptoms.—The joints, the nervous system, and the viscera may be affected by syphilis, and a thorough knowledge of the disease is necessary to carefully investigate these points in connection with bone lesions of doubtful origin.

The Spleen.—This organ is so frequently enlarged, especially in inherited syphilis, that in young children we should always examine it. Fox and Ball, in an article on Hypertrophy of the Spleen in Infants (Jour. Brit. Med. Association, April 23, 1892), say that, in 175 cases of inherited syphilis, in 75, or 48.4 per cent, the spleen was found by palpation to be enlarged at some time or other, and this result agrees well with Gee's conclusions. Barlow thought the percentage still greater. Haslund, in 154 necropsies, found the spleen enlarged in 38 per cent. In 44 cases of adults with acquired syphilis the spleen was enlarged in 27. Weber gives 75 per cent, and other observers might be quoted. We thus see that the diagnosis involves a careful and thorough examination of the patient for any present or previous evidences of syphilis, and in hereditary cases a similar examination of the parents.

Differential Diagnosis.—Syphilitic osteitis may be mistaken for tubercular osteitis, for rachitis, for malignant growths, and for simple osteitis due to traumatism. Osteoperiostitis of specific origin must be diagnosed from the nonspecific, and osteomyelitis due to gummata from acute osteomyelitis.

Although open to some objections, perhaps the clearest manner in which to contrast these various diseases is by means of tables. In the preparation of these tables some points may be included which are of doubtful value; but any and every symptom is of value, and should be considered in doubtful cases. The diagnosis between syphilitic osteitis and that due to tuberculosis is as follows:

SYPHILITIC OSTEITIS.

TUBERCULAR OSTEITIS.

- | | |
|--|---|
| 1. Previous history of syphilis. | 1. No such history. |
| 2. Usually affects the shafts of the long bones, rarely the epiphysis and the neighboring joint. | 2. Usually affects the epiphysis and the neighboring joint, rarely the shaft. |

3. Often affects the bones of the cranium and the face.

4. Other symptoms of syphilis present.

5. Indications of previous syphilitic disease, such as notched teeth, etc.

6. Osteocopic pains referred to the bone affected.

7. Has a tendency to the formation of new bone, which may subsequently break down.

8. Abscesses, if present, usually small and acute.

9. Pain worse at night, usually continuous.

10. Pain not relieved by traction or position.

11. No symptoms of tuberculosis.

12. Lesions often symmetrical.

13. Frequently more than one bone affected.

14. Microscopical and bacteriological examination give negative results.

15. Inoculation experiments may be negative.

16. The bone is usually increased in size.

17. Increase of temperature rare.

18. Amyloid degeneration of liver, spleen, and other organs rare.

3. Rarely affects the bones of the cranium and the face.

4. No such symptoms present.

5. No such indication.

6. Pain referred to the neighboring articulation rather than to the bone.

7. Has a tendency to the destruction of bone.

8. Abscesses may be very large, are not acute; cold abscesses form slowly, and may give rise to few if any symptoms.

9. May be worse at night, but is different in character. The "night cry" of joint disease is peculiar. The child cries suddenly or moans in sleep, and then is quiet again; the pain is not continuous.

10. The pain usually relieved by traction, or perfect immobilization, or placing the limb in a certain position.

11. Other symptoms of tuberculosis may be present.

12. Rarely so.

13. Rarely so.

14. Microscopical and bacteriological examination show the presence of the bacilli of tuberculosis.

15. Inoculation experiments may prove the existence of tuberculosis, even where no bacilli were found.

16. Rarely much increased.

17. Increase of temperature common.

18. A common result in bad suppurative cases.

19. In the majority of cases proper antisyphilitic remedies arrest or modify the disease.

20. General glandular enlargement common.

21. Gummata usually terminate in caseous degeneration.

22. Gummata usually larger than tubercles.

23. When new bone is formed, sclerosis and eburnation common.

19. No such effect.

20. Not so common.

21. Tubercles frequently undergo caseous degeneration.

22. Tubercles usually smaller than gummata.

23. No such results. Bone tissue destroyed not usually reproduced.

When the two diseases exist at the same time, or one follows the other, the diagnosis may be very difficult, but as a rule it can be made by a careful study of the case. It has not seemed necessary to divide the subject under the heads of hereditary and acquired syphilis, as under the head of pathology the forms affecting each variety were discussed.

In very young children the diagnosis of specific osteomyelitis has to be made from acute osteomyelitis or the acute arthritis of infants.

SYPHILITIC OSTEOMYELITIS.

1. History of syphilis in parents or child.

2. Other symptoms of syphilis.

3. Formation of abscess and destruction of bone slow.

4. Use of antisyphilitic remedies beneficial.

ACUTE ARTHRITIS OF INFANTS.

1. No such history.

2. No such symptoms.

3. More rapid usually.

4. No such result.

Both diseases are rapidly fatal unless proper treatment is begun early, and a differential diagnosis is often very difficult.

The differential diagnosis between syphilitic osteitis and rachitis is as follows:

SYPHILITIC OSTEITIS.

1. Previous history of syphilis, or evidences of existing disease in child or parents.

2. Affects principally the shafts of the long bones.

3. Rarely affects the ribs.

4. Bones of skull when affected usually show nodes.

RACHITIS.

1. No such history.

2. Affects principally the epiphyseal ends of bones.

3. Commonly affects the ribs.

4. Bones of skull when affected usually show thinned condition of cranio-tabes.

5. Fontanelle may close, as in cases where no disease exists.

6. Long bones when bent are thickened.

7. Crests of tibiae when affected always larger and broader.

8. No symptoms of rachitis present.

9. No cachexia present.

10. Results of antisyphilitic remedies beneficial.

11. May disappear and leave no trace of deformity.

12. Osteocopic pains, and pain worse at night.

13. Lesions often terminate in destruction of bone.

5. Closure of fontanelle usually delayed.

6. Long bones when bent not thickened; may be thinner than normal.

7. Crests of tibiae when affected usually thinner (see illustration 13).

8. Symptoms of rachitis present, such as prominent abdomen, beaded ribs, pseudo-paraplegia, bowlegs, knock-knees, etc.

9. Cachexia present.

10. No effects from such treatment.

11. Always leaves more or less deformity.

12. No such pains.

13. Do not so terminate.

From malignant tumors or other tumors of bone the diagnosis may have to be made. This usually, however, is rare, and only in the early history of the case :

SYPHILITIC OSTEITIS.

1. History of syphilis.

2. Evidences of an existing or a previous syphilis.

3. Lesions generally multiple.

4. Growth slow, not excessive.

5. Osteocopic pain, and worse at night.

6. Beneficial results of antisyphilitic remedies.

7. Microscopical examination negative.

8. No cachexia.

9. General lymphatic system involved.

TUMORS OF BONE.

1. No such history.

2. No such evidences.

3. Rarely so.

4. Growth in benign tumors may be slow, in malignant may be rapid. Size attained is greater.

5. May be painless.

6. No such results.

7. Microscopical examination shows the character of the growth.

8. Cachexia usually marked in malignant tumors.

9. Not always involved.

10. Lesions often terminate in destruction more or less complete of bone.

10. Do not so terminate.

From periostitis or osteoperiostitis due to traumatism, the following symptoms are of value.

SYPHILITIC OSTEOPERIOSTITIS.

1. May occur in infants.
2. History or evidence of syphilis in parents or child.
3. History or evidence of syphilis in the patient.
4. Usually more than one bone involved.
5. No history of traumatism.
6. Local symptoms comparatively mild.
7. May terminate in abscess.
8. Progress of the disease usually slow.
9. Beneficial effects of proper anti-syphilitic treatment.

NONSYPHILITIC OSTEOPERIOSTITIS.

1. Rarely in infants.
2. No such history.
3. No such history.
4. Usually only one bone involved.
5. History of traumatism.
6. Local symptoms marked.
7. Frequently terminates in abscess.
8. Progress of the disease usually rapid.
9. No such effects.

Prognosis.—Prognosis in bone syphilis must be based on the age of the patient and the amount and character of the disease.

In very young children the mortality is high; the bone lesions are usually only one indication of the disease, other parts, such as some of the viscera, being at the same time affected. If suppuration be added to the specific disease, the children may die of sepsis, but this is rare.

The changes in the bone may lead to subsequent deformities, as where an epiphysis and a diaphysis become separated, a flail joint may result, or by union in a faulty position in such cases more or less permanent deformity may follow.

Sturgis, in the *Archives of Pediatrics*, v, 237, gives the statistics of the Moscow Hospital from 1860 to 1870, where, of 1,938 children born with syphilis, 1,425 died. Etienne, quoted in the *Medical Record* for February 4, 1893, gives the mortality of infants born of syphilitic mothers who had not been subjected to mercurial treatment as over seventy-six per cent at birth, and over ninety-five per cent when the few children born alive are kept under observation. When the mothers have been subject to anti-syphilitic treatment this mortality drops to from eleven to sixteen per

cent. If the treatment is pushed during the course of pregnancy, statistics show it is reasonable to hope that very few if any of the children will perish. This does not give the result in cases of bone lesions, but the general results. Hereditary bone syphilis occurring later in life is *per se* rarely fatal.

In acquired syphilis lesions of bone may be followed by serious results. When the bones of the skull or face are affected, deafness, hemiplegia, neuralgias, blindness, and other troubles may result. If meningitis occur it may be rapidly fatal if suppurative in character. The prognosis as to recovery from disease of the long bones is good, but it is only when the cases are seen early that the size of the bone affected can be reduced by treatment. Gummata in the periosteum and the bone may disappear, but if formative osteitis has occurred the exostosis or hyperostosis usually remains, or is only slightly reduced in size. In none of the cases seen by the author has much reduction in size occurred, although such cases have been reported by competent and trustworthy observers.

Treatment.—The indications for treatment in bone syphilis are, first, to treat the constitutional disease; secondly, its local manifestations in the bones. Appropriate remedies for the constitutional symptoms are such as are used in syphilis affecting other parts. The iodide of potassium and mercury, either singly or in combination, internally, mercury externally in the form of oleates, ointments, or baths, are the remedies indicated. Tonics, good hygienic surroundings, nourishing food, and suitable medication for any intercurrent affections, are necessary. As for the local conditions, the general indications are to relieve the pain, promote healing if the lesions are destructive in character, to control, if possible, any tendency of the disease to spread to the neighboring tissues, and to prevent and overcome deformity.

In gummata affecting the periosteum, or even the bone, if the swellings present as soft tumors, even though the skin above be reddened and glazed in appearance, it is best not to open them unless suppuration has actually taken place. These tumors disappear under appropriate internal and external medication, and if bony formation has occurred nothing is gained by incising them. If suppuration supervenes or an abscess forms, then open freely, thoroughly scrape out, and treat on general surgical principles.

If the pain is severe and not relieved by internal treatment, an incision through the periosteum will often afford the desired relief, or in cases of gummatous osteomyelitis it may be necessary to trephine the bone. This is only indicated where the incision through the external parts of the bone does not relieve the pain, and where, from increase in size of the bone, it is recognized that the medulla is affected. When sequestra form, care should be exercised in their removal that they are entirely freed

from the surrounding bone. In syphilis they are apt to separate slowly, and if an operation is prematurely undertaken too much tissue may be removed, or in some cases only the partly loosened portion taken away, and the disease, not being arrested, a subsequent operation has to be performed.

When an epiphysis has been separated from a diaphysis, the same indications exist as in fractures. Correct the deformity at once, retain the limb in proper dressings, apply suitable splints or apparatus, and get union in the best possible position. Where superficial or deep necrosis has occurred and the parts are covered with unhealthy granulations, these should be removed, the parts made surgically clean, and the healing promoted in the usual manner. In all cases where the necrosed tissue acts as a source of irritation, remove it. Until this is done healing will not take place. This is especially important about the nose and face, as in these parts disease spreads from one bone to the other. By means of the surgical engine and bone drills the diseased bone can be removed, the parts thoroughly irrigated, proper dressing applied, and recovery ensue. Care should always be taken about the face and skull to limit the suppuration as much as possible, as by extension within the skull a fatal result from meningitis may ensue. "

Where bony tumors press on nerves and thus cause painful neuralgias, if under proper medication they do not decrease in size and the pain continues, then their removal is indicated. This, however, rarely occurs. To overcome the deformities produced by the disease is often a matter of great interest and difficulty. Of course, if bones have been fractured and deformity ensue, a suitable osteotomy will generally correct it. The most troublesome deformities, however, are about the face, and as the soft parts have often been extensively destroyed and replaced by cicatricial tissue, extensive plastic operations may be required, or unfortunately the destruction may be so great as to prevent anything being done, as in the case of Dr. Bulkley's, referred to in this article.

Where the nose is sunken, several plans may be adopted to overcome the deformity—the best, according to Weir, in an article on this subject in *New York Medical Journal* for October 22, 1892, being those of König as modified by Israel, and the use of a platinum support devised by Martin.

DACTYLITIS SYPHILITICA.

In the tertiary stages of acquired syphilis, and at any time in those suffering from hereditary disease, the fingers or toes may be the seat of gummatous infiltration, either in the connective tissue and fibrous structures of the joints or in the periosteum or bone.

The disease under consideration has also been described under the name of SYPHILITIC PANARIS; but, if used at all, this term should properly be limited to affections of the soft parts, and the appellation *dactylitis* used where deeper tissues are involved. It is derived from the Greek word δάκτυλος, digit or finger.

Up to the time that R. W. Taylor wrote his classical article on the subject in 1871 only five cases had been recorded, but since then many observers have reported cases, and the affection, though rare, is well recognized.

The pathology does not differ in the acquired or hereditary cases, except that in hereditary disease the lesions often occur in early childhood, and, as in other bone lesions, in early life the tendency to degeneration is greater, and the destruction of soft parts and bone may be marked. The phalanges of the fingers are more often attacked than those of the toes; and while cases have been reported of every finger, and of the thumb, yet the middle and ring finger are more often involved than the others. Fox says it is rarer in acquired than in hereditary syphilis.

Two varieties of the disease are described. In the *first variety* the subcutaneous connective tissue, as well as the fibrous structures of the articulations, are involved; in the second, the disease begins in the periosteum or bone, and may secondarily involve the joint. The subcutaneous connective tissue may or may not be involved. As we might expect, the clinical history differs slightly in the two varieties. Unlike gummata—seen, for instance, in the muscles, forming a well-marked tumor—when the subcutaneous connective tissue is first involved no distinct tumor can be made out, and in many cases the gumma seems adherent to the skin, or the gummatous material may be simply found through the connective tissue. One phalanx only may be involved, or two or three; the joint at the end of the phalanx may be affected or not.

The dorsal surfaces are more prone to the process than the palmar or plantar. The size of the part affected is increased, and this may gradually shade off into the soft parts of the hand or foot, forming a ridge or ring. The rapidity of growth varies. In all cases, whether developed rapidly or slowly, it is essentially chronic in character, and may even resist prolonged antisiphilitic treatment. At times the disease may disappear

almost completely and then recur. The tendency is to disappear under treatment, and this occurs as a rule without the formation of abscesses. The gummata may break down, but they rarely suppurate.

When this form of dactylitis occurs the skin over the part affected is purple or violet in color, and the parts may feel tense and resisting or soft and yielding, suggestive of fluctuation. As the gumma is absorbed, the color of the skin changes and gradually resumes the normal.

The nails usually escape, even though the tissues about the last phalanx may be involved. In rare instances the tissues between the fingers may necrate, but this is due to the distention of the parts from the disease of the first phalanx. The fibrous structures about the joints are involved secondarily, and are due to an extension of the process. The ligament, especially that portion forming the capsule of the articulation, becomes involved, gummata develop in the form of small tumors, so that when repair takes place the entire ligament is not destroyed, but only that portion in which the tumors formed.

The part destroyed is replaced by new tissue, and, as is often the case with such formation, it may contract, and thus bind the fingers more closely than they normally are, and produce impairment of motion or even deformities. The finger may be either overflexed or overextended at the particular joint involved. The existence of disease in the ligaments may have an effect upon the tissues beneath and interfere seriously with the nutrition of the cartilage and the synovia, or even the bone. Synovitis, however, is rarely the result. Crepitation may be noted, and, when present, is possibly due to changes in the cartilages at the articular ends of the phalanges, causing erosion. The favorite site for this form of dactylitis is the first phalangeal joint, and it is seen either early or late in the tertiary stage of the disease, and usually exists in connection with other lesions of syphilis.

The changes produced in the joint when erosion occurs may result in ankylosis or serious impairment in joint function.

In the *second variety* of dactylitis syphilitica the changes begin in the periosteum or bone; there may exist periostitis, osteitis, or osteomyelitis. The production of gummata causes increase in size of these tissues, and a marked enlargement of the phalanx or phalanges involved. The soft parts are stretched and tense, the skin is reddened and at times very sensitive to the touch. The increase in size of the bone is due to the same causes as the increase in the larger bones when affected with syphilis.

If the periosteum is first involved it becomes swollen, thickened, and may be loosened from the underlying bone; gummata form within it or between it and the bone, and we soon have as a result either the production of small tumors, which may break down or cause permanent thickening as the result of the periostitis that occurs. When the gummata

set up an osteitis there is first the rarefying form of the disease, which causes destruction of the bone involved and subsequently formative osteitis, which to a certain extent replaces with new tissue the portions destroyed. The destruction may be limited to the surface of the bone, or the formative osteitis, by causing pressure on the blood-vessels and destroying circulation, may give rise to necrosis.

The gummata, when broken down, appear as yellowish fluid of varying consistency, at times even cheesy in character. This gradually comes to the surface, and either at this time or earlier mixed infection may occur and pus be found. When this takes place more or less destruction of the soft parts usually ensues. In the fingers and toes the process generally extends to the neighboring joint or joints, and synovitis or arthritis is present.

Under proper treatment the gummata may entirely disappear, or the periosteum and bone involved may show permanent changes. From the formative osteitis they may be increased in size at certain parts, and from the rarefying osteitis diminished. Decrease in size, as a final result, is the most common, and the length or thickness of finger may be altered. The joints may be destroyed and false joints occur, or, in rare instances, ankylosis. These false joints are due to the fact that the gummatous infiltration has caused a solution of continuity in the shaft of the bone, and nonunion has resulted. The phalanges being short and the joint proper also being destroyed, this is an accident that may seriously impair the utility of the finger.

When new bone has formed, as in formative osteitis in other bones, the new tissue may be harder and denser. Sclerosis and eburnation occur, so that, although diminished in size, the bone may be nearly as firm as ever.

When the medulla is involved at the onset the symptoms are generally more acute, the pain more severe, and the increase in size of bone greater and more rapid. In rare cases a gumma in the medulla may become surrounded by new bone and remain without causing any very marked symptoms.

Symptoms.—In dactylitis syphilitica the symptoms are few; one or more fingers in children suffering with hereditary disease or in persons who are in the secondary or tertiary stages of acquired syphilis, begin to increase in size. This increase usually begins in the shaft of a phalanx, and is more rapid when the disease begins in the bone than when it begins in the soft parts. As the disease advances the soft parts covering the bone become stretched. Changes in color become more livid, and may be bright red, but more usually are a purple or violet hue. The skin may or may not have a glazed appearance. When the swelling is very marked, ulceration is apt to occur, a discharge of the broken-down gumma

takes place, secondary pus infection occurs, and we have as a result an ulcer or a sinus. The pain accompanying the disease may or may not be severe, but, like other pains in bone syphilis, is usually worse at night.

Fox makes the statement that the disease is rarer in acquired than in hereditary syphilis, and, although it may be correct, the majority of reported cases are in adults. As in bone syphilis affecting other bones, the lesions are frequently multiple, and other symptoms of syphilis may or may not be present.

In hereditary disease the lesion appears during the early years of life. In acquired syphilis many years may elapse between the chancre and the dactylitis.

Olmstead (Southern Med. Record of Atlanta, vol. xx, p. 56) reports a case of an infant twenty-two months of age, in which the first phalanx of the ring-finger of the right hand was involved, and the first and second phalanges of the same finger on left hand. The development of the symptoms was slow, and the skin was not discolored. At the largest part the right ring-finger measured four and a quarter inches. The teeth were notched. The post-earrival and occipital glands were enlarged, and the head was large. Whether any hydrocephalus was present or not is not stated. The toes showed a tendency to enlargement, but no actual disease was made out. Under proper treatment a cure promptly ensued.

In a case reported by Deakin (Indian Medical Gazette of Calcutta, 1878) the syphilis is said to have occurred eight years previously, and in this patient the palmar and outer surface of the right thumb, chiefly over the metacarpal bone and extending over the joint to the metacarpus, was the region involved.

In a case reported by Fox (Journal of Cutaneous and Venereal Diseases, 1882) the disease occurred three and a half years after primary infection. This patient had a gumma of the right forearm, in addition to the dactylitis of the right middle finger.

The multiplicity of the lesions is also well illustrated in the case referred to by Wigglesworth (Boston Med. and Surg. Jour., May 9, 1872), in which there were nodes on the tibia and dactylitis of the first phalanx and the joint of the left ring-finger, and of the great and second toes at their second phalanges.

As a good example of the hereditary form the illustration of the case reported by Taylor (Archives of Scientific and Practical Medicine, April, 1873) is here introduced :

The patient was a female, six months of age. At birth she presented no lesions of the skin, and was apparently a well-developed child; but when a month old she was afflicted with a roseola, mucous patches, and snuffles, all of which disappeared, and were replaced by a general papular syphilide. When the child was six weeks old its mother noticed that its right middle

finger was enlarged, but she could not obtain any evidences of pain. The enlargement slowly increased for two months, when the skin covering the first



FIG. 14.—Syphilitic dactylitis.
Inherited. (After Taylor.)

phalanx became slightly red and thickened, and tender and very tense from the pressure within. This inflammation of the integument and enlargement of the bone progressed very slowly; and at the end of ten weeks, which would be the fourth and a half month of the existence of the trouble, fluctuation was discovered, and an incision made by a surgeon on each side of the finger, with the result of liberating a considerable quantity of pus. At this time the patient came under treatment. The right hand presented the appearance shown in the illustration (Fig. 14), which is taken from a cast made from life. The middle finger was greatly swollen, being fully an inch in all diameters and having a circumference of two and three quarter inches. The finger was very markedly flexed, and could not be extended—a fact which was due to the tension produced by the swelling of the bone on the flexor tendon. This condition, which I have also observed in two other similar cases, continues as long as the swelling is great,

and consequently disappears very slowly. The fore and ring fingers were very much separated, and were rendered unwieldy by their abnormal position. This was very noticeable when the child clasped any small article between the thumb and forefinger. The ulcers which resulted from the incisions had a sloughy base, similar to that observed in ulcerating gummata, were surrounded by a livid, undermined edge, and they secreted considerable quantities of sanious pus. There was no evidence, nor had there been, of spontaneous pain, but the finger was sensitive to handling, as evidenced by the distressed look of the child's face. According to the mother's statement, the child nursed and slept well, and its strength was not impaired. I immediately placed the mother on half-grain doses of the protiodide of mercury twice a day, with five grains of the citrate of iron and quinine before each meal. Her mucous patches were treated locally, and I applied faradization to the contracted arm.

For the child I ordered a grain of the hydrargyrum cum creta three times a day; and, after slightly penciling the surface of the ulcers with nitrate of silver, I ordered an ointment composed of ung. hydrarg., two drachms; ung. simpl., six drachms. During the month of June very little change took place in the finger, which was fully as large as ever, but the cutaneous and mucous lesions had disappeared.

At the end of July it was noticed that the ulcers discharged less, that their edges were less everted, and that there was a diminution in the circumference of the phalanx of one quarter of an inch. During the month of August there was also an improvement, and the finger was an eighth of an inch less in circumference, and during this month the child had not taken the powders more than ten days, in consequence of gastro-intestinal disorder. At this time the mother was greatly improved in health, her strength being nearly normal,

having no mucous or cutaneous lesions, and she was able to flex or extend the arm, and the biceps muscle was as large as its fellow.

The case progressed favorably during the months of September, October, and November, for during this period the bone became markedly less swollen. The ulcers, however, did not wholly heal, and required stimulation about once a fortnight, as exuberant granulations appeared on their floor. Early in January the ulcers had fully healed, leaving a depressed, thin cicatrix on each side of the finger, which was adherent to the bone. At this time the finger presented the following appearance: It was three eighths of an inch longer than its fellow of the other hand, owing to an elongation of the first phalanx, which was flattened laterally, so that its transverse diameter was a little less than half an inch, while its antero-posterior diameter was about three quarters of an inch. The mobility of the finger seemed perfect, and the child was able to grasp any article with the hand with normal power.

In another case by Taylor the child was four years and four months old, and the parts affected were the lower end of the right radius, the upper end of the left ulna, and the metacarpal bone of the index-finger of the right hand. The metacarpal bone was greatly enlarged, and presented to the feel a perfectly oval form. It was about an inch and a quarter in diameter at its middle, and then shaded off gradually on each end. It completely filled up the triangular space which exists normally between it and the metacarpal bone of the thumb, and its enlargement was also visible upon the palmar surface of the hand. It was painful to manipulation, but there was no lesion of the skin, though this structure was stretched considerably over it (Fig. 15).

In this child the syphilis was acquired by kissing its baby sister, who had mucous patches.

The appearance of the fingers, when dactylitis of hereditary form causes destruction of bone tissue and subsequent shortening, is well seen in the case of Volkmann, quoted by Taylor:

The patient was a girl, who at fourteen had a swelling of the upper part of the left ulna, and at her twentieth year a swelling in the right wrist, left knee joint, and left ankle. Two years after this her right foot swelled; but the skin over the joint was not involved. Motion gradually became impaired, until a fixed and slightly flexed position was produced. Spontaneous pain did not exist, but the parts were sensitive to pressure. The knee joint recovered its mobility in a year, and the left ankle joint in about five years, whereas the affection in the right ankle disappeared, and then recurred with greater severity. This was coincident with pain in the head and limbs. Very soon nodes appeared upon



FIG. 15.—Syphilitic dactylitis. Acquired. (After Taylor.)

the shafts of the tibiae and on the frontal protuberances. The swelling in the right wrist extended after a few weeks over the dorsum of the hand, involving the first and second phalanges of the thumb and the three adjoining fingers. The thumb and the second and third fingers recovered their normal condition in about three months, but the integument of the index-finger gradually reddened upon its radial side, and in about a year opened and discharged a little pus, but no bone; then closed, leaving the motion of the finger impaired. In her twenty-eighth year a swelling appeared upon the ulnar side and dorsal surface of the left hand, which, becoming red, extended to the integument of the first and second metacarpal bones. An incision was made into this swelling, which gradually enlarged into a circular ulcer. This healed slowly, leaving a fistula at the base of the metacarpal bone, which healed later on. In the following year (the patient then being twenty-nine) the first phalanx of the thumb of this hand enlarged, and in a year the last phalanx also became enlarged. Coincidentally the first phalanges of the first and second fingers and the whole of the right toe became enlarged. The course in these cases was more acute, and necessitated several incisions. She had been unsuccessfully treated with non-



FIG. 16.—Syphilitic dactylitis. Inherited. Showing loss of tissue and shortening of finger. (After Volkmann.)



FIG. 17.—Syphilitic dactylitis. Inherited. (After Volkmann.)

specific remedies for sixteen years previous to January, 1869. At this time her condition was as follows: The body was ill nourished; there were no cutaneous lesions nor enlargement of the lymphatics, but upon the frontal tuberosity were several nodes; the spleen was very much enlarged; the right wrist was slightly

flexed and fixed, and the styloid processes were prominent; the integument over the affected points was tense, and in some spots livid; the cicatrices and fistulæ were small, and situated upon the dorsal surface of the hands; when a probe was passed into the fistulæ a spongy tissue was felt, but no denuded bone.

The right hand (Fig. 16) showed the results of the destructive process; the first phalanx of the index-finger was considerably shortened, and so constricted at its center, where a small cicatrix was seen, that the bone appeared to be divided into two pieces, and the patient had to fix the finger with a glove, so great was the mobility.

The two other phalanges were normal. The middle finger was much emaciated, the second phalanx was in a position of superextension,

while the first was slightly fixed. The bones, though unchanged in form, were atrophied, and the integuments, joints, and tendons were normal.

In the left hand (Fig. 17) the lesion was in progress; on the dorsum was a large, smooth, movable cicatrix, adjoining a small, retracted spot at the base of the first metacarpal bone, which atrophied and produced a marked shortening of the thumb. The first phalanx of the middle finger was very much swollen and obliquely perforated by a sinus, and the bone was completely divided into two parts by an intervening, newly formed tissue. The two phalanges of the thumb and the first phalanx of the index finger, and the first phalanx of the right middle toe, were smaller, but there was no sinus or solution of continuity of the bone. The femur, the knee, and the ankle were normal, but upon the tibiæ were numerous nodes, and the shafts of these bones were thickened.

Under the influence of chloroform an incision was made into the last diseased phalanges, and the granular deposit was scraped out. This texture was slightly vascular, soft, yellow, and dry. Pus was not found in it, but was present in the sinuses. This same material was found under the integument of the index-finger. The incision rapidly healed. In the middle finger the shortening increased, and, owing to a retention of pus, an opening was made, and the interior of the metacarpo-phalangeal joint could be seen, where the synovial membrane and cartilages were found to be healthy. The swelling of the toe retrograded without local treatment. The patient came under Dr. Volkmann's care in January, 1869, and had taken iodide of potassium from that time until the latter part of April, with an astonishing effect upon the osseous lesions. At this time she was seized with very profuse hæmorrhage from the stomach and bowels, which resulted in death.



FIGS. 18 and 19.—Syphilitic dactylitis. Acquired.
(After Berg.)

Other forms that the swelling may take on are seen in Figs. 18 and 19, from a case of Berg's, quoted by Taylor. In these but one phalanx is involved, and the joint is comparatively free. The appearance of tubercular dactylitis may vary little from that of the specific form, still there are differences, which, taken together with the history, enable us to make a diagnosis. Fig. 20 shows the hands of a boy, five years of age, suffering from tubercular disease of the vertebræ and dactylitis.



FIG. 20.—Tubercular dactylitis.

The disease was of one year's standing, and began in the forefinger of the right hand; a few months subsequently the little finger of the same hand became swollen, an abscess formed and opened, and there has been a slight discharge ever since. Lately the thumb of the left hand has become swollen. In all these instances the first phalanx is the one involved, and the disease has begun at the articular end of the bone. The skin is not glazed, and is of normal color.

Tubercular dactylitis is perhaps a more common disease than might be supposed, and this is perhaps due to the fact that many medical men ascribe all cases of dactylitis seen in early childhood to syphilis, and thus but few cases are on record. During the past year the author has seen four cases, and in three a diagnosis of syphilis had previously been made and the usual treatment for such cases given. In one instance three different surgeons, all of repute, insisted that a case was syphilitic, although the parents denied syphilis and presented no signs whatever of the disease, nor did the child. In this case the ring-finger of the left hand was affected. An abscess formed; it was opened, and the loss of

tissue which resulted produced a deformity similar to that in the case of Volkmann's (Fig. 16). The child later on developed a well-marked osteitis of the right knee, which is now being treated. The mother of this child, two years after the dactylitis was discovered, was found to have tuberculosis, and has since died of the disease.

In another case a child of two years of age had well-marked dactylitis, which affected the middle fingers of both hands. The iodide of potassium had been faithfully tried, and she had been taken to several clinics, and in all the diagnosis of syphilis had been made, and yet the only symptom present was the dactylitis. The parents denied syphilis. The child was placed in the hospital and died of broncho-pneumonia a few months later, and at the autopsy no signs of syphilis were found.

As in syphilis affecting the bones, dactylitis syphilitica in early childhood is usually accompanied by some of the other numerous symptoms of syphilis. A careful examination will generally either reveal the presence or absence of the disease in one or both of the parents or in the child. All the symptoms of general syphilis must be considered, and if no active disease exists, a careful search must be made for any traces of the previous lesions.

In later life the same is true, and those whose experience is the largest believe that without a history and careful examination for the presence or absence of other symptoms, no absolute diagnosis can be made between the tubercular and the syphilitic forms of dactylitis.

In adult life some cases of dactylitis occur which never progress to the extent that the finger becomes markedly enlarged or that never go on to suppuration. These are usually seen in patients suffering from an acquired syphilis of many years' standing, in whom the treatment has either been improperly carried out, or in whom treatment has long since been abandoned. As soon as the slight thickening is recognized, either by the patient or the surgeon, active treatment is begun and the disease is practically aborted; and as the syphilitic deposit is entirely absorbed, no trace of the disease may be left.

Diagnosis.—The diseases with which dactylitis may be confounded are paronychia or whitlow, gouty and rheumatic affections, enchondroma, exostoses, and tuberculous lesions.

As in bone syphilis the best comparison is by means of tables, so the same plan will be adopted here, using the table of Deakin, with additions:

SYMPTOMS.	SYPHILITIC DACTYLITIS.	TUBERCULAR DACTYLITIS.	RHEUMATIC ARTHRITIS.
1. Site.	Phalanges, metacarpal bone of thumb.	Carpus, metacarpus, and phalanges at their articular ends.	Phalanges.
2. Tissue.	Compact tissue (shaft of bone), periosteum connective tissue.	Bone, cancellous tissue, and the synovial membrane.	Synovial tissues.
3. Age.	Adult, as a rule.	Childhood.	Adult life.
4. Condition of skin.	Thickened, red, purple, tense, glistening.	Thickened, may be pale or red, purple, and tense.	Normal.
5. Shape.	Roundish, diffuse swelling.	Uniform enlargement of articular ends.	Uneven enlargement of articular ends.
6. Feel.	Varying from hard to soft.	Varying from hard to soft.	Usually soft.
7. Pain.	Not severe; often worse at night.	Slight; may be absent at first.	Painful.
8. Symmetry.	If tertiary, usually symmetrical, and other joints involved.	Rarely symmetrical.	Other joints usually involved.
9. Tendency.	To suppurate.	To suppurate.	Not to suppurate.
10. Course.	Rather acute.	Chronic.	Rather acute.
11. History.	History of syphilis.	No history of syphilis; there may be a history of tuberculosis.	No history of syphilis; may be a history of rheumatism.
12. Microscopical and bacteriological examination.	Microscopical and bacteriological examination negative.	Microscopical and bacteriological examination may show bacilli of tuberculosis.	Microscopical and bacteriological examination negative.
13. Results of specific medical treatment.	Rapidly improved, if not dispersed.	No result.	May improve.
14. Results of treatment.	Recovery rapid.	Recovery very slow.	Improvement under proper remedies.

ENCHONDROMA.	EXOSTOSIS.	PARONYCHIA.	GOUT.
Metacarpal bones and phalanges.	Junction of shaft and epiphysis, muscular attachments. Dorsal surface of great toe.	Last phalanges.	Great toe joints and phalanges at their articular ends.
Usually within the substance of the bone which incases the growth.	Often from ossification of the epiphyseal cartilage.	Tissues about the nail and the soft part.	The synovial membrane.
Adolescence.	Adolescence.	In children and adults.	Adult life.
Normal.	Normal.	Red, purple, glazed.	Normal.
Clearly circumscribed, not involving joint.	Clearly defined, broad and flat, or pedunculated.	Diffuse, most marked about the nail.	Defined, and limited to articulation.
Usually firm.	Hard.	Soft, with sense of fluctuation beneath.	Varying from soft to hard.
Painless.	Painless unless a nerve is involved.	Very painful.	Painful.
Often symmetrical.	Often symmetrical.	Never symmetrical.	Often symmetrical, and more than one joint involved.
To ossify.	To eburnate.	To suppurate.	Not to suppurate.
Usually chronic.	Chronic.	Rather acute.	Rather acute.
No specific history.	No specific history.	No specific history.	No specific history, but history of gout.
Microscopical examination may show the character of the growth.	Microscopical examination may show the character of the growth.	Microscopical examination will show pus.	Microscopical examination may show chalky deposits.
No result.	No result, but exostosis of clavicle in childhood may disappear spontaneously.	No result.	No result.
Slow to improve.	Slow to improve; usually not affected by treatment.	Incision and evacuation usually only cure.	Improvement under proper remedies.

Prognosis.—The prognosis in dactylitis is good, although losses of substance may occur which impair the appearance and usefulness of the finger. Where only one phalanx is affected and the joint not involved, recovery may leave the finger in normal condition, or there may result slight thickening which is of no consequence. If the articulation is involved, ankylosis may result, or, if destruction occur, a flail joint; the latter condition is perhaps more serious than the former, and will require the use of some form of support to enable the finger to be used to advantage. If suppuration occur, the soft parts may be destroyed and disagreeable cicatrices result and thus new deformities be produced, and this may complicate the prognosis. Another element to be considered in prognosis is the amount of other tissues involved, as this is generally only one indication of the disease, and may be the least serious.

Treatment.—The treatment should be constitutional and local. The constitutional treatment should be that used for a case of syphilis—the iodides, either singly or in combination with mercury. Tonics and proper remedies for the general health should not be neglected.

The *local treatment* is the same as for gummata in other bones; incision should not be resorted to. The swelling will resolve and disappear under appropriate treatment. If suppuration has occurred, the part should be freely opened, drained thoroughly, and treated on general surgical principles. The incision should be made in the long axis of the finger, so as to avoid cutting the tendons, and the finger kept in such position that, if ankylosis should unfortunately occur, the finger will be extended. A permanently flexed finger is of less use and more in the way than one ankylosed in a straight position or nearly so. If necrosis of bone has occurred, by means of the Volkmann spoon or curette all diseased tissues should be thoroughly removed, and healing promoted in the usual manner. These fingers should not be amputated except in very rare instances, and in such cases the necessity will arise from subsequent pus infection, and not from the syphilitic dactylitis.

SYPHILIS OF THE UPPER AIR-PASSAGES.
THE NOSE, PHARYNX, LARYNX, TRACHEA, AND BRONCHI.

BY JOHN NOLAND MACKENZIE, M. D.

HISTORICAL.

It is not the purpose of the present article to discuss the antiquity of the venereal complaint, but simply to briefly review the evidence of its ancient origin so far as it relates to affections of the nose and throat. As some of the weightiest arguments in favor of the remote existence of syphilis rest upon the supposed early recognition of specific disease of the upper respiratory apparatus, it may be interesting to examine the reasons alleged for this assumption, which has been defended with so much talent and erudition.

It has been maintained by some that certain passages in the ancient records of Chinese and Hindu medicine render it probable that syphilitic affections of the nose and throat have been recognized from the earliest times. (For a full statement of this argument, see Lancereaux's *Treatise on Syphilis*, New Syd. Soc. Trans., 1868, vol. i, pp. 8-10; quotations taken from Captain Dabry's book, *La Médecine chez les Chinois*, Paris, 1863; and from Hessler's translation of the *Ayur Véda*.)

The evidence deducible from the researches of Dabry is, however, as Verneuil (see Lancereaux) has pointed out, inconclusive in view of their many chronological inaccuracies, while there is no sufficient reason for the belief that the disease described in the *Ayur Véda* is the affection which we now recognize as syphilis.

Both Hippocrates (*Epid.* 6, sec. 1) and Galen (*Isag.*, cap. 20) allude to falling in and depression of the nose from recession of the palate-bones, and they and their followers refer to destructive ulceration of the larynx, trachea, and nose. Aretæus (*De causis acut. morborum*, lib. i, cap. 8), in his famous and much-discussed description of the disease called *ura*, asserts that the palate-bone is sometimes laid bare, and that the ulcerative process spreads over to the fauces, and even the epiglottis; but these isolated observations furnish obviously slender data upon which to base the antiquity of the venereal complaint.

The attention paid to and the frequency with which the disease called

by the Greeks *ozæna* is encountered in the writings of the ancients, are at first sight naturally suggestive of their acquaintance with syphilitic affections of the nasal passages; but if we reflect upon the sense in which this term was employed by the large majority of physicians and grammarians of those times, we shall be obliged to confess that it forms an uncertain element in the chain of evidence which links the nasal syphilis of to-day with the *ozæna* of the Greek physicians.

By many of the ancient medical writers *ozæna* and *polypus* are used as convertible terms, and the cure of the two affections is considered under the same head.

In this sense, too (i. e., as synonymous with *polypus*), the term is used by Pliny; and even among the later Latin grammarians the appellation *ozænosus* was applied to those who suffered from nasal polypi. It is exceedingly probable, then, that the term *ozæna* did not carry with it the same significance which attaches to its use at the present day. The ancients have left but scanty record of the measures they adopted in cleansing the nasal passages; and, indeed, if we consider their notions concerning the pathology of nasal discharges, it would not be surprising if they neglected that important process altogether. A form of instrument, the *rhinenchytes*, for injecting the nasal cavities, is mentioned by Aurelian (*De chron. morb.*, lib. ii, cap. 4; lib. iii, cap. 2) and Scribonius Largus (*De compositionibus medicamentorum*, comp. vii), but it is highly probable that the important hygienic measure of systematic cleansing and disinfection was neglected, and that the secretion was allowed to accumulate and decompose within the nostrils—a condition which we know favors the development of a peculiar odor even in simple catarrhal inflammation of these cavities. It is, moreover, very probable that the hypertrophic, and consequently the atrophic, form of rhinitis were common affections among the citizens of ancient Greece and Rome. Finally, as the term *ozæna*, especially when used in the sense of a stench from the nostrils, serves to express a number of different pathological states, and in the light of our present knowledge concerning atrophic rhinitis, it is illogical to maintain that the ancients were acquainted with the nasal form of syphilis because of the frequent allusion to *ozæna* in their medical writings.

The foul mouth, hoarse voice, and snoring respiration of the cunnilingus, fellator, and irrumator (see especially Martial, i, 66, 79; vi, 41; iv, 41; xi, 30; vi, 55; xi, 92, 61; vii, 33, etc.), have been thought to indicate syphilitic affections of the throat; but, as I have suggested elsewhere, they were doubtless the symptoms of a catarrhal process acquired in the discharge of their filthy occupations.

Reiskes thus describes the *cinædus* or sodomite: “In naribus et in palato vitium, a qua clare non potuerint eloqui, sed, *ῥεγχεῖν* stertere et

rhoncissare debuerint" (Observ. miscellan., Leid., 1745, def. p. 28). The value of this passage in evidence, it seems to me, turns upon the rendering of the word *vitium*, and not, as Rosenbaum (Die Geschichte der Lustseuche im Alterthume, Halle, 1845) and others maintain, upon the verb *ῥεγγειν*, which may mean anything from a simple inflammatory condition to destruction by ulceration; and it may with equal justice be contended that the affection described by Reiskes may be referred to the advanced forms of hypertrophic naso-pharyngeal catarrh. At all events, there is no possible reason why we should lay the affection of the sodomite at the doors of syphilis.

Equally uncertain is the evidence adduced by the same writer (Orationes ex recensione, Lipsiæ, 1784, vol. ii, orat. 33; see also Rosenbaum, *op. cit.*, p. 158) from the disease of the armpits among the Lesbians, which destroyed their noses and voices, and was supposed by Dio Crysostom, who drew attention to it, to have been the angry visitation of the goddess Aphrodite.

If now we turn to the passages which have been taken from the satirical writers of antiquity, the same uncertainty is found. The following are the only ones, it seems to me, worthy of the slightest consideration. The first is taken from Martial. A certain Festus, after he found that a dire disease had invaded his fauces and crept into his countenance, committed suicide.

"Indignas premeret cum tabida fauces
Inque ipsos vultus saperet atra lues" (lib. i, 78).

The second is also from Martial, and refers to the debauchee and sodomite:

"Qui recitat lana fauces et colla revinctus
Hic se posse loqui, posse tacere negat" (lib. iv, 41).

Now, it is perfectly obvious that the disease from which Festus was supposed to suffer may have been a cancerous or other malignant affection; and in the case of the debauchee it is manifestly absurd to infer the existence of syphilis from what was most probably a simple sore throat.

In the fifteenth century there lived an obscure poet, by name Pacificus Maximus, who, in spite of his apparently dissolute tendencies, as reflected in a volume of wanton poems published by him in 1489, managed to eke out a lascivious existence of exactly one hundred years.* Among his poems is the following invocation of Priapus, which possesses a certain historical value:

* Born 1400, died 1500.

"Tuque meum si non properas sanare Priapum,
 Decidet heu! non hoc nobile robur erit.
 Ante meis oculis orbatus priver, et ante
 Abscissus fœdo nasus ab ore cadat!
 Non me respiciet, nec me vollet ulla puella,
 In me etiam mittet tristia spata puer,
 Lactior heu! toto me non erat alter in orbe!
 Si cadet hic, non me tristior alter erit.
 Me miserum! Sordes quas marcidus ore remittet!
 Ulcera quæ fœdo marcidus ore gerit!
 Aspice me miserum, precor, O! per poma, per hortos,
 Per caput hoc sacrum, per rigidamque trabem,
 Hinc ego commendo tota tibi menta, Priape,
 Fac valeat, sic sit sanus ut ante fuit."*

In connection with the early origin of the venereal complaint I would like to call attention to the following passages, which I discovered accidentally while engaged in a historical research foreign to the subject now under review. The sonnet is one by Sulpicius Lupercus Servastus, Junior,† and runs as follows:

"Atqui sunt, quod propter honestum rumpere fœdus,
 Audeat inlicite pallida avaritia.
 Romani sermonis egens, ridendaque verba
Frangit ad horribiles turbida lingua sonos.
 Sed tamen ex vultu adpetitur spes grata nepotum.
 Saltem istud nostri forsitan honoris habent.
 Ambusti torris species, exesaque seculo
 Abduntur priscis corpora de tumulis
 Perplexi crines, frons improba, tempora pressa,
 Extantes mala deficiente genæ
Simatque jacent pando sinuamine nares.
 Territat os nudum, cæsaque labra trement.
 Defossum in ventrem propulso pondere tergum
 Frangitur, et vacuo crure tument genua.
 Discolor in manibus species, ac turpius illud,
 Quod cutis obscure pallet in invidiam."

(Sulpicius Lupercus Servastus, Junior, in *Anthologia veterum latinorum epigrammatorum et poetarum*, Lib. i, p. 515 *et seq.*, ed. Burmann, Amstelodami, 1759.)

Leaving now the question of the ancient recognition of the throat and nasal lesions of syphilis, and coming down to the close of the fifteenth century, when the affection is generally supposed to have been discovered,

* Attention was first called to this poem by Sanchez, in the *Journal de Vandermonde*, for October, 1759 tom. ix.

† Nothing is known concerning the age at which this member of the Sulpicii lived, the only trace of his literary existence being preserved in the above.

we find that the earlier writers on the lues venerea looked upon softening of the uvula, ulceration of the pharynx, tonsils, and fauces, perforation of the palate, catarrhal and destructive disease of the nasal passages, and a hoarse and rauous character of the voice, as diagnostic signs of the disease (see Nic. Leoncini, *De epidemia, etc.*, in *Aphrodisiac, sive de lue venerea*, ab Aloysio Luisino, Lugd. Bat., 1728; Nic. Massa, *De morbo gallico*, cap. 7, et quarti tract., cap. 4, *Aphr.*, pp. 46, 96, and 97; Jacob. Cataneus, *De morb. gall.*, cap. 4, *Aphr.*, p. 148; Pet. Maynardi, *De morbo gall. tract.*, i, c. 4; Fernelius, *De lue venerea caput*, *Aphr.*, pp. 613, 614; Victorius, *De morb. gall.*, liber, cap. 3, alludes to flattening of nose and caries of nasal bones, ozaena, polypus, hypertrophic catarrh, etc.; Marchelli, *De morb. gall. tract.*, *Aphr.*, p. 732; Fallopius, *De morb. gall. tract.*, cap. 23, *Aphr.*, p. 781, and cap. 93, p. 824; Botallus, *Luis venerae curandae ratio*, cap. 4; Tomitanus, B., *De morb. gall.*, lib. i, cap. 28, p. 1047, also lib. ii, cap. 1, p. 1053; Sylvius, *De morb. gall. tract.*, p. 1109; Paschal, *De morb. gall. tract.*, p. 1113; Borganutius, *De morb. gall. methodus*, cap. 7, p. 1129 *et al.*; see also Benevenius, Antonius, *De morb. gall. tractatus*, in his work *De abditis nonnullis ac mirandis morborum et sanationum causis*, Florent., 1507; this work is the first essay on pathological anatomy, Library Surgeon-General's Office, Washington). Among them, Frascatorius (*Hieronymi Frascatorii, Veronensis, Syphilis, sive morbi gallici*, lib. iii, lib. i, *Aphr.*, p. 187, B. and lib. ii, *Aphr.*, pp. 191, 192, C., A. D. 1555; see also Frascator, *De Syphilide, seu morb. gall. lucubratio*, cap. 1, *Aphr.*, p. 199), in his celebrated poem on syphilis, speaks of affections of the voice and obstruction in the pharynx; and Alexander Trajanus Petronius (*De morbo gallico*, lib. ii, cap. 22, *Aphr.*, pp. 1222, 1223, and lib. vii, cap. 8 and cap. 19) (1566) refers to liquids taken by the mouth returning thereby, and to chronic hoarseness (*vox rauca perseverans*) as symptoms of syphilitic infection. Both Maynardi (*loc. cit.*) and Fallopius mention difficult breathing from disease of the larynx and trachea, and tinnitus and other symptoms referable to disease of the ear were observed, among others, by Botallus, Tomitanus, and Petronius.

While these writers were doubtless thoroughly conversant with the ravages produced by syphilis in the nose and pharynx, and with affections of the voice and respiration, nothing definite was known concerning the pathological changes in the larynx until about the middle of the seventeenth century, when Marcus Aurelius Severinus (this case is recorded in the *Collegium Anatomicum* of Severinus, from which it is taken by Bouctus, *Sepulchretum*, Ludg., 1700, tom. i, p. 766) found in the body of a girl, dead of syphilis, the epiglottis completely destroyed by ulceration. This writer (see Astruc, *De lue venerea*, tom. ii, p. 921; Van Swieten, *Comm. in Aphor.*; Boerhaave, § 1445; and Lientand, *Hist. Med.*, tom.

ii, lib. iv, obs. 105, Parisiis, 1777; also Lieutaud, Synopsis of Pract. of Med., ed. Atlee, Philadelphia, 1816, p. 97) seems also to have been familiar with ulceration of the trachea, bronchi, and œsophagus.* In 1678 Gunther Christopher Schellhammer (Diss. inaug. de voce, ejusque affectibus, cap. 2, p. 52, Jenæ, 1678) adverted to dryness of the larynx from ulceration of the uvula; and in the early part of the following century Vercollonius (De pudendorum morbis, sec. 2, 12, p. 182; 9, 10, 13, p. 183, and 14, p. 184, Lugd. Bat., 1722) gave a systematic account of syphilitic affections of the tonsils, pharynx, larynx, trachea, and œsophagus. Later on the subject of throat syphilis, from a clinical standpoint, was treated of in detail by Boerhaave (Aphorism. de cognos. et curand. morbis, § 1445, Lugd. Bat., 1728; also Tract. de lue venerea, Lugd. Bat., 1751), Astruc (De morb. ven. libri sex, etc., ii, cap. 2, cap. 7, iv, cap. 4, and cap. 8 and 11, § xii, Parisiis, 1736, 1738, and 1755; see also Lond. ed. of 1754, pp. 124 to 159 of Bk. ii, and pp. 9-14, 15, 89, 90 of Bk. iv), Plenck (Joseph Jacob Plenck, Doctrina de morbis venericis, pp. 93, 94, 97, 99, 100, 143, 147, and 149-151, Viennæ, 1779; this writer seems to have been personally familiar with syphilitic affections of the œsophagus and cicatricial stricture of the pharynx), Benjamin Bell (A Treatise on Gonorrhœa Virulenta and Lues Venerea, vol. ii, pp. 37 and 43, Dublin, 1793), John Hunter (Treatise on the Ven. Dis., pt. vi, chap. ii, p. 262 *et seq.*, in works, with notes by Babington, Phila., 1839; see also Babington's excellent observations, pp. 266, 268), and Swediaur (Complete Treatise on the Symptoms, Effects, etc., of Syphilis, Phila. ed., 1815, p. 293; Swediaur also alludes to affections of the ear [tinnitus] from compression and corrosion of the Eustachian tubes, p. 294), while Morgagni (De sedibus et causis morborum, epist. xlv, cap. 15, Lond. ed., 1769) directed attention to the anatomical appearances of the affection. Among the writers of the eighteenth century Raulin (Traité de la phthisie pulmonaire, par M. Raulin, pp. 13 and 79, Paris, 1784) seems to have been acquainted with syphilitic ulceration as it affects the larynx, trachea, and œsophagus.†

* Severinus's observations were made in the post-mortem room of a large hospital for venereal complaints, and must be regarded as the first pathological researches in the direction of syphilitic affections of the larynx.

† In the sixteenth century, Schenck, of Grafenberg (Observat. medicæ de capitate humano; hoc est exempla capitis morborum, etc., obs. cccxlix, p. 397, Basilie, 1584), spoke of the "gula ex ulcere gallico exesa proeiciens devorata," and also of perforation and loss of the palate (obs. cccxlvii, from Paré). In 1778, Andrew Duncan (Medical Cases, etc., p. 176 *et seq.*, Edinburgh, 1778) called attention to dysphagia resulting from increased sensibility of the pharynx from pre-existing syphilitic sore throat; and Zeviani (quoted by Voigtel, Handbuch d. path. Anat., Bd. ii, Halle, 1804) placed on record a case in which a syphilitic ulcer of the windpipe communicated with the œsophagus. I would also call attention to the fact that Dolæus (Encyclopædia chirurgica rationalis, etc., ii, cap. v, p.

At the beginning of the present century, Thomann (J. N. Thomann's *Annalen der klinischen Anstalt in dem Julius Hospitale zu Würzburg* f. das Jahr 1800, p. 242, Würzburg, 1803; see also case in Hufeland's *Bibliothek der prakt. Heilkunde*, Bd. ii, St. ii, S. 143) drew attention to syphilis of the windpipe; and Altenhofer (*Beobachtungen über die Natur u. Heilung der Syphilis*; *Russische Sammlung f. Naturwissenschaft u. Heilkunst*, Bd. i, St. ii, 2ter Abschnitt, S. 36, Riga u. Leipzig, 1816) announced, in a very valuable paper based on extensive experience, that tracheal phthisis is often the result of malignant or neglected syphilitic throat ulceration.

The impulse given to the pursuit of pathological anatomy by the colossal labors of Morgagni led, among other things, to the study of ulceration of the upper air-passages, and to the publication of a number of special treatises on the subject.*

I. SYPHILIS OF THE NASAL PASSAGES.

The great vascularity of the lining surfaces of the nasal passages, their spongy and cavernous structure, their constant exposure to the exciting causes of hyperæmia and inflammation, together with a certain amount of vulnerability begotten of their natural delicacy of structure, combine to make the nose an attractive site for the localization of syphilitic lesions. Indeed, the annals of syphilis in years gone by contain no more graphic illustrations of its power for tissue destruction than those afforded by the nasal apparatus.

276, *Franeofurti ad Mœnum*, 1703), in his chapter on strictures of the œsophagus, observes, "Aliquando angustia hæc fieri solet a earuncula gulæ ex ulcere venereo aborta." These cases of œsophageal syphilis may be added to those collected from the older literature of the subject by Astruc, Van Swieten, and Lieutaud.

* The principal of these are the following: Before the era of pathological anatomy, Richard Morton, *Phthisiologia, seu exercitationes de phthisi*, Londoni, 1689; after the time of Morgagni, Petit (M. A.), *Diss. de phthisi laryngæ*, Monspelii, 1790, October 25th; copies of both these rare tracts may be found in the library of the Surgeon-General's office; Sauvée, *Recherches sur la phthisie-laryngée*, Paris, 1802; Schönbach, *De phthisi laryngæ*, Wilmæ, 1808; Jos. Sigaud, *Recherches sur la phthisie laryngée*, Strasburg, 1819; Wilhelm Sachse, *Beiträge zur genaueren Kenntniss u. Unterscheidung der Kehlkopfs-u. Luftröhren-Schwindsucht*, Hanover, 1821; Barth, *Mem. sur les ulcerations des voies aériennes*, *Arch. gén. de Méd.*, 1839, p. 137, et folg., which culminated in the classical *mémoire* of Trousseau and Belloc (*A Practical Treatise on Laryngeal Phthisis, Chronic Laryngitis, and Diseases of the Voice*, translated from the French, Phila., 1839). These observers, as well as those who preceded them, included syphilis, tuberculosis, and other chronic laryngeal affections under the generic term "phthisis laryngæa," and this confusion practically reigned until the introduction of the laryngoscope, and the pathway to differential diagnosis was opened by the laryngoscopic studies of Tueck (Allg. Wiener med. Zeitung, No. 48, 1861; No. 43, 1866; also *Klinik der Krankheiten des Kehlkopfes*, etc., Wien, 1866).

ACQUIRED NASAL SYPHILIS.

Primary Lesion.—The initial sore of syphilis is very rarely found in the nasal passages. In the few recorded cases of this accident the poison appears to have been conveyed by means of unclean instruments (Eustachian catheter), or by the introduction of the finger into the nose. The cartilaginous septum, the inner surface of the alæ, and the junction of the mucous membrane and skin, are the situations in which the chancre has been found.

As far as can be judged from the meager literature on the subject, the appearance of the ulcer does not present all the well-known characteristics of a typical chancre. The immediate diagnosis—that is to say, before the appearance of any skin lesion—must therefore rest upon the presence of unusual hardness in the sore and the negative result of microscopic examination of the secretion taken from it. The latter test, which the scientific precision of to-day demands in all doubtful cases, excludes tuberculosis, and therefore lupus, and narrows the differential diagnosis down to the separation of the ulcer from malignant neoplasm. In this situation both chancre and primary cancer are rarely met with, and, if doubt should arise, the subsequent behavior of the lesion will soon settle the matter.

Rhinitis.—Acute and chronic rhinitis are common in syphilitics. There is nothing by which the rhinitis of syphilis may be differentiated pathologically from catarrhal rhinitis, except perhaps the deposit of connective tissue in excess in the hypertrophic stage, the often swift passage of this stage into the atrophic or atrophic, and the preponderance in some cases of pus-cells in the discharge. Rhinitis may appear at any period of the disease.

Secondary Lesions, Erythema, Mucous Patches.—Erythema, according to most authorities, is rarely met with, but as it gives rise to little discomfort, and is evanescent in character, it is doubtless often overlooked. Mucous patches, on the other hand, are seldom encountered within the nasal fossæ. Opinions differ as to the frequency with which they are found at the junction of the mucous membrane and the skin. The mucous patch is a fugitive lesion, and gives rise to comparatively little discomfort when situated at the vestibule of the nose. Hence comparatively few cases consult the rhinologist, who is therefore not in the position to judge of the matter that the syphilographer occupies who watches his patient throughout the whole course of the disease.

Lesions of the Tertiary Period.—In the secondary period the structure chiefly involved is the mucous membrane. Occasionally ulceration following the disintegration of a mucous patch or condyloma, and extending below the superficial layers, is met with, but this is excep-

tional. In the tertiary period, on the other hand, all of the nasal structures may be involved, either singly or in combination.

The lesions of this period are gummata, diffuse infiltration, deep ulceration, and fibroid degeneration.

Gummata and Diffuse Infiltration.—At the present day circumscribed and diffuse gummatous deposit in the nasal passages is not seen as frequently as in former times. Indeed, the same may be affirmed of all tertiary lesions.

Although found in every portion of the nasal cavities, gummatous infiltration is most commonly met with on the septum and floor of the nostrils. The posterior nares and turbinated bodies are also favorite seats of the gummatous deposit. The primary seat of the infiltration may be in the mucous membrane, bone, and periosteum, or in the cartilage.

Deep, destructive ulceration generally follows the disintegration of gummatous infiltration, and is therefore chiefly found in the situations spoken of above as favorite seats of this degenerative lesion of syphilis.*

Fibroid Degeneration.—In the International Journal of Laryngology and Rhinology for April, 1889, I first called attention to this form of syphilis of the nose. As far as I am aware, the condition had never before been described, either by rhinologists or writers on venereal disease. Fibroid degeneration of the larynx (*vide infra*) had been recognized, but had not attracted, as it does not now attract, the study it deserves. It occurs not only in the constitutional syphilis of the adult, but also in the congenital form of the disease (*vide infra*). As almost all writers on laryngeal syphilis overlook the fibroid changes in the larynx, and as the presence of interstitial fibroid degeneration of the nasal passages and pharynx seems to be practically unknown, I will give a brief description of its chief characteristics, for the condition is not only of pathological but also of great clinical importance.

Like the fibroid changes in the larynx, it is met with mainly in those long-neglected cases, with their story of a life of reckless dissipation, which turn up at the hospital and dispensary. I have seen it more commonly in men, and especially in those addicted to the constant use of large quantities of alcoholic beverages. While it occasionally affects the septum and other parts of the nasal cavities, the turbinated bodies are the structures which chiefly suffer, and in which its pathological nature may be most conveniently and satisfactorily studied. These bodies are very much enlarged, and present the appearance of dense, hard, whitish-yellow or red sessile masses, or are converted into distinctly pedunculated growths, which not only resemble but are in actual fact true fibroid

* The appearance and pathological history of the gummy tumor and syphilitic ulcer will be found in the section on Syphilis of the Larynx.

polypi of this region. Indeed, I am inclined to believe that a large proportion of the so-called fibroid tumors of the nasal fossæ found in syphilitic subjects are none other than the prolongations of the degenerate



FIG. 1.—Syphilitic fibroid degeneration of the middle and inferior turbinated bodies. Rhinoscopic image.

turbinated bodies. These fibroid masses obstruct the passage of air, and often alter in a marked degree the anatomical relations of the parts. They are sometimes attacked by ulceration, and in this way partially destroyed; or they may be bound, as the result of the ulcerative process, to opposing structures by dense band of cicatricial tissue.

Portions removed with the snare present under the microscope a more or less complete conversion of the turbinated body into a dense fibrous tissue. The erectile cells and glands are either totally obliterated or inconspicuous, while the encroachment of the fibrous process on the epithelial layers impedes its nutrition and causes degeneration and detachment of its cells.

In this way it happens that the greater part of the mass is destitute of epithelium. As far as my isolated and limited experience goes, it would seem that the tendency in this variety of nasal syphilis is toward the

production of fibrous outgrowth in excess rather than in the direction of final atrophy; and this point may serve to differentiate it pathologically from the ordinary hypertrophic rhinitis of syphilis.

The pharynx is probably less frequently than the nasal passages the seat of fibroid degeneration. The parts most commonly affected are the tonsils and faucial pillars, which are sometimes converted into a dense mass in which all trace of their original anatomical appearance is lost. In one of my cases the uvula was enormously enlarged, elongated, indistinctly lobulated, of the hardest consistence, and interfered markedly with the muscular movements of the palate.

Symptoms, Complications, and Sequelæ.—These are obviously manifold, and vary from slight discomfort to total abolition of nasal functions and complete destruction of the nasal framework. Their full consideration in detail is therefore not possible in the contracted limits of the present review. Familiar sequelæ are perforation of the cartilaginous and bony septum and of the palatine roof, caries and necrosis of bone, "ozæna," and extension of the disease to the antrum and other accessory cavities, and to the bones of the face and skull. Cases have been reported

in which the brain and meninges have been involved, and death from meningitis has resulted. Death has also resulted from the detachment of large portions of the bony structures of the nostrils. The remarkable case of Baratoux, in which the greater portion of the sphenoid bone was detached and expelled without brain symptoms, is most exceptional in character. A distressing case, in which death resulted from neglected nasal syphilis, occurred under my own observation some years ago.

A young married woman of high social standing had for a long time trouble with her nose, but, ignorant of its true cause, and not wishing to disclose her misfortune to others, neglected treatment until the bridge of the nose sank in and the odor of carious bone compelled her to seek medical aid. I found almost the entire cartilaginous and part of the bony septum gone, the perpendicular plate of the ethmoid loose and hanging free in the central line. I removed with care the entire plate, and also large portions of the turbinated bones. Under constitutional treatment the patient was restored—with great deformity of the nose, of course—to perfect health. She remained so for three years, when she was taken ill again, and the family undertook to treat the case at home. When I saw her weeks afterward, the disease had destroyed the entire turbinated structures, the antra were widely open, necrotic, and filled with foul pus, and convulsions and other brain symptoms had set in. In spite of vigorous treatment she died in a few days of meningitis.

Other familiar sequelæ of nasal syphilis are the deformities, both external and internal, to which it gives rise. Opposing intranasal structures may be bound together by adhesions (*syncchiæ*), the anterior and posterior nares may be obliterated by cicatricial tissue, or the entire fossæ (in rare cases) be rendered completely impervious throughout their entire length. In other cases the anatomical relations are so disturbed that the true structure of the nasal fossæ is placed beyond recognition.

The deformities of the external nose are quite characteristic. As the result of ulceration and disintegration of tissue the bridge and fleshy portion of the nose sink in and form several notable shapes. Thus, the nose may be simply flattened



FIG. 2.—Destruction of nose and upper lip by tertiary syphilis. (Photographed by Dr. R. T. Taylor.)

across the bridge (producing several varieties from simple depression to the well-known "saddle-shape"), or, when the intranasal destruction is ex-



FIG. 3.—Acquired syphilis; showing effect of tertiary disease of the nose. (Photographed by Dr. R. T. Taylor.)

tensive, the alæ may collapse toward the middle line, forming with the depressed and pendulous tip of the nose a typical deformity which we may denominate the trefoil or clover-leaf deformity.

Occasionally perforation of the sides of the external nose occurs, or the whole organ may be completely destroyed.

A very rare result of nose syphilis is general septic infection, with the formation of metastatic abscesses in other portions of the body.

Diagnosis.—The diagnosis of the various forms of syphilis of the nose is, as a rule, sufficiently easy. It may be well, however, to call atten-

tion briefly to a few by no means impossible sources of error.

In the first place, it should be constantly kept in mind that, while perforation of the nasal septum—and this is especially true of the bony septum—is in the vast majority of instances due to syphilis, it may be due to other causes and present appearances identical with those seen in syphilitic destruction of the cartilage and bone. Thus it may be (1) congenital; (2) the result of traumatism, as in picking the nose, the incautious use of instruments and chemical applications; (3) intentional perforation (operation of Blandin for deflection of the septum, consisting of punching a hole in the cartilaginous portion with an instrument resembling a conductor's punch); (4) the result of ulceration left by certain acute blood diseases, such as typhus, typhoid, and scarlet fever, smallpox, diphtheria, etc.; (5) the result of hæmatoma or abscess of the septum; (6) the ulceration of tuberculosis or its close blood-relation lupus; and, finally, (7) it is a common and characteristic accident in factories where chrome* and allied substances are manufactured. In the chrome factory of Baltimore, the workmen employed in the chambers where the bichromate is made al-

* See article by the author in the *Journal of the American Medical Association*, November 29, 1884; also one in the *Annales des maladies de l'Oreilles, du Larynx, etc.*, 1884.

most invariably acquire perforation of the cartilaginous septum from the irritating and corrosive action of the fumes and floating dust evolved during the chemistry of its manufacture. There is generally absence of ozæna or fetor; simple medication effects a cure if removal from the exciting cause is possible; the process is self-limited, and when the ulceration is no longer active there is no deformity of the external nose. By these characteristics it may be distinguished from the perforation of syphilis.

In the second place, care should be taken not to confound fibroid degeneration with gummata, for the treatment for the two lesions is entirely different. In the one, surgical aid is indicated; in the other, surgery would be most disastrous. The fibroid masses are to be distinguished by their often pendulous or polypoid character, by their irregular outline, by their pale color, and by the anæmic condition of the surrounding mucous membrane. Gummata, on the contrary, are soft, elastic, present a peculiar yellowish, submucous discoloration, and are generally surrounded by a congested mucous membrane.

In the third place, synechiæ and scar tissue found in the nasal passages by no means always point to syphilis, although they may well excite the gravest suspicion. The former may be congenital, and both may be due to other ulcerative diseases, or to various traumatic or chemical causes.*

The differential diagnosis between syphilitic, tubercular, and cancerous ulceration will be found in the section on Laryngeal Syphilis. It is only fair to state, however, that in the nasal passages the differences between the three are not always as clearly defined as they are in the pharynx and larynx. Finally, the odor which occurs in the disintegration of bone caries and necrosis in syphilis should not be confounded with the peculiar stench which accompanies cirrhosis of the nasal membrane. This latter has been compared by the French to the smell of crushed bed-bugs, but even this is not sufficiently descriptive. It is penetrating, sickening, diagnostic in itself—an odor *sui generis*. Each odor is separate and distinct, and the combination of the two baffles all the powers of description.

Prognosis.—In mild forms of syphilis of the nose the prognosis is uniformly good. Even in tertiary lesions, under modern methods of treatment, it is excellent. In the presence of extensive destruction of the hard structures it is much worse, though a great deal can be done to arrest the disease, if the condition of the patient and his environment are otherwise good. Finally, in some cases there appears to be an innate malignancy, rebellious to all treatment, which only stops at death.

* I have seen, as the result of frost-bite, deformities of the external nose which resembled in every particular the condition left by syphilis.

Treatment.—The management of nasal syphilis is (1) constitutional and (2) local. The constitutional treatment of syphilis is fully given in other portions of this work. Rhinitis calls for the ordinary measures employed in the treatment of catarrhal inflammation. Mucous patches and condylomata are best treated with nitrate of silver, in solid stick, or in strong solution (3j ad 3j). Tertiary ulcers heal well under iodoform and allied substances. Caries and necrosis should be managed on ordinary surgical principles. Dead bone should be removed with caution, especially when not detached with ease. I have personal knowledge of cases in which the surgeon brought on serious symptoms by the too vigorous removal of sequestra. Indeed, sequestra, even when loose, may possibly be detached with fatal results, and the surgeon may receive the odium from which Nature would have protected him a few days later.

In desperate cases, the interior of the bony nose may be exposed by dissecting up the lip and soft parts of the nose (as in the Ronge and similar operations) and carrying them over the forehead. Fibroid growths may be removed instrumentally (snare, electric cautery), or by means of chemical action (acids, etc.). In the removal of gummata the internal administration of iodide of potassium may be combined with the topical application of iodine, or a weak solution of the iodide of zinc.

CONGENITAL SYPHILIS OF THE NASAL PASSAGES.

The nasal passages of the congenital syphilitic may be the seat of all the lesions described above under the head of acquired disease. In babyhood the superficial lesions, notably purulent catarrh or rhinitis, is most commonly met with, while the deeper destructive lesions are found later on in life, and notably in the so-called "latent" form of the disease. This rule is, however, by no means absolute, for widespread destruction of the intranasal framework has been found not many months after birth.

Syphilitic coryza, or the "snuffles" as it is popularly called, was supposed by Diday to be due to the presence of mucous patches within the nose; but this is probably an incorrect supposition, for most authorities deny the frequency of mucous patches on the nasal mucous membrane. The rhinitis of congenital syphilis is usually a purulent rhinitis, becomes quickly offensive, and leads often swiftly to hypertrophy and subsequent atrophy with the development of ozæna. The discharge is especially acrid, and excoriates and fissures the upper lip and nasal vestibule. The turbinated bodies become quickly permanently swollen; mouth-breathing results, with interference with the act of suckling, and therefore with the maintenance of life. If the case be neglected, the secretion later on becomes bloody and more purulent, and the nutritive processes correspondingly arrested. Rhinitis may be intrauterine in origin, or it may not supervene until a few weeks after birth.

As stated above, the deeper destructive lesions are usually seen later in life, and especially at some physiological epoch, as puberty. At this latter period the destruction of the nasal tissues is often widespread.

Treatment should be carried on in obedience to the same rules that regulate the management of the acquired disease. The system should be rapidly put under the influence of mercury. The nasal passages should be scrupulously cleansed by means of disinfectant solutions, followed by antiseptic applications, among which the bichloride of mercury ranks especially high. After syringing the nostrils with warm milk, the detergent and disinfectant may be applied. This cleansing process should be done two or three times a day, or oftener, according to circumstances. In the evening, an ointment may be applied as a substitute for the liquid applications—such as, for example, one containing the yellow oxide of mercury in the proportion of six to ten grains to the ounce of vehicle, and allowed to remain in the nose during the night.

Temporary relief to the obstruction in the earlier stages may be obtained by the exhibition of weak solutions of cocaine or menthol; but care should be exercised, especially in the not only constant but occasional use of the former drug, as in young children its effects are often disastrous. The physician should be on the lookout for a too sudden cessation of the discharge, which sometimes occurs, and is followed by symptoms of septic infection.



FIG. 4.—Inherited syphilis; showing external deformity of the nose. (Photographed by Dr. Hewetson.)

II. SYPHILIS OF THE PHARYNX.

ACQUIRED PHARYNGEAL SYPHILIS.

The Primary Lesion.—The initial lesion of syphilis is occasionally found in the pharynx, and almost invariably on one of the tonsils, the posterior wall being singularly exempt. Sometimes the upper pharynx is the seat of the primary sore, and not a few cases are on record in which the constitutional disease was communicated by means of the Eustachian catheter.

The diagnosis of pharyngeal chancre is often a difficult matter, as the characteristics of the primary sore of syphilis are not always well marked, and the diagnosis must be made from the subsequent development of constitutional symptoms.

Secondary Lesions.—By far the most common lesions of syphilis in this region are erythema and catarrhal inflammation. A symmetrical arrangement of the erythematous patches is regarded as characteristic of syphilis. There is nothing peculiar to the pharyngeal catarrh of syphilis. In a certain proportion of cases, however, there is a somewhat characteristic discoloration of the mucous membrane, which is suggestive of the disease. When to this is added a tendency to symmetrical patches of cloudy swelling of the epithelium, suspicion of its specific nature may be aroused.

Mucous patches are constant accompaniments of pharyngeal syphilis, and are found most commonly on the soft palate, faucial pillars, and tonsils, rarely on the posterior wall. Varying in size, they appear as whitish or bluish-white elevations—circular, oval, or stratiform—arranged symmetrically on the swollen and hyperæmic mucous membrane. They may be fugitive in nature, disappearing spontaneously in a few weeks, or the epithelium may be cast off, and superficial ulcers result. The ulceration from a mucous patch is sometimes so extensive that it may be confounded with the destruction of a tertiary lesion.

Tertiary Lesions.—The characteristic lesions of the tertiary stage found in the pharynx are gummata, diffuse infiltration, and ulceration. I have also met with extensive fibroid degeneration of the pharyngeal structures similar to that described above. The mode of development of tertiary ulcers in the pharynx is identical with the manner in which they appear in the larynx (see section referred to). They are found in all portions of the upper and lower pharynx. When seated on the soft and hard palate they show a marked tendency to perforate.

The ravages produced by tertiary syphilitic ulceration of the pharynx are sufficiently familiar. In addition to the perforations already referred to, widespread destruction of the palate, tonsils, posterior wall, and other parts may occur; caries and necrosis of the posterior wall and pharyngeal vault may complicate the case, or extensive adhesions may form, with partial or complete obliteration of the pharyngeal cavities. Occasionally a perforating ulcer opens a large artery and alarming hæmorrhage occurs, or the ulcerative process may extend to the brain or spinal cord, with a fatal result.

CONGENITAL SYPHILIS OF THE PHARYNX.

Of great interest are syphilitic affections of the pharynx in the congenital form of the disease. The fauces, velum, and posterior wall

present simply an erythematous efflorescence, or are the seat of lardaceous infiltration. Occasionally the follicles seem to be the starting point of the disease. They stand out prominently, are filled with a yellowish secretion, and are surrounded by a well-defined inflammatory areola.

Although mucous patches are frequently found on the uvula, tonsils, and faucial pillars, the posterior wall is singularly exempt. Hypertrophy of the tonsils is present in a large proportion of cases. It is simple in character, or the glands may be the seat of lardaceous infiltration. In the latter case they have a square outline, and a uniform, smooth, waxy appearance, in which it is difficult to recognize the mouths of the follicles and lacunæ.

Warty growths are found in the pharynx, both in the acquired and in the congenital form of syphilis.

With deep ulceration of the pharynx stomatitis is commonly associated. The parts are thickened, infiltrated, and present a characteristic albuminous appearance. On this pale ground ramify arborescent wine-colored vessels, and here and there small hæmorrhages are seen beneath the mucous membrane. There is often a scarlet line along the gums at the insertion of the teeth, which stands out in striking contrast to the surrounding pallor of the membrane. This is most easily determined by the carious condition of the teeth, and may be analogous to the inflammatory zone which surrounds other syphilitic lesions.

Morell Mackenzie has called attention to the absence of the characteristic notching of the teeth in those in whom the throat is affected. Out of seven cases examined by me in 1879, in reference to this point, there were three in which the notching was not present. In one of these there was a deficiency in the left central upper incisor, giving it a more or less V-shaped appearance, and in another a roughening of the lateral edge of the lower central incisor of the right side. In the third the teeth were apparently sound.

It is generally laid down in the text-books that deep ulceration of the mouth and pharynx in congenital syphilis is very rare; and Mr. Holmes (Surgical Treatment of the Diseases of Children, p. 350, London, 1868) went so far as to say that the affection of the palate, so common in syphilis of the adult, is "so rare in children that it is doubtful whether the few cases which occur in infants during syphilis may not be mere coincidences." A great deal of confusion prevails concerning this question, in consequence of the persistent adherence to the old superstition which regards them as of "scrofulous" origin. It is impossible to exaggerate the rôle of congenital syphilis in the production of the deep destructive pharyngeal ulceration of childhood. The subject is not one of purely pathological interest: under a misconception of its true nature,

syphilis, uncontrolled, will lead to destruction and deformity, and influence for evil the future happiness and usefulness of the individual.

Deep ulceration may invade the bucco-pharyngeal cavities at any period of life from the first week up to the age of puberty. Out of thirty cases analyzed with reference to the period of invasion, fourteen occurred within the first year—a proportion of nearly one half—and of these, ten within the first six months. Whitehead (*On the Transmission from Parents to Offspring of some Forms of Disease*, p. 137, London, 1851) has observed putrid ulceration of the throat in an infant three days old. Of the remaining cases, the majority occurred at a period more or less advanced toward puberty.

It is an accepted fact that syphilis may lie in a state of potential activity within the system for many years after birth. Lying thus quiescent, it seems to await the advent of some physiological epoch to call its phenomena into activity. Thus puberty and its surrounding years is often selected as the chosen period of its outbreak. When the eruption of the disease is thus deferred, it is on the palate and in the pharynx that it most frequently makes its appearance, and deep palato-pharyngeal ulceration often first attracts attention to the existence of a diathesis of which it is the sole pathological expression. Lesions of these structures are found with a peculiar constancy, and upon them syphilis apparently concentrates all its energy and exhibits most of its virulence.

Females are attacked more frequently than males. Out of sixty-nine cases of pharyngeal ulceration, forty-one occurred in the female sex.

That the pharyngeal cavity should be frequently attacked is easily understood, when we reflect upon its great vascularity and the irritation to which it is constantly subjected. Ulceration may occur in any situation, but its favorite seat is the palate, and especially the hard palate. When it takes place at the posterior part of the hard palate the tendency is to involve the soft palate and velum, and thence to invade the posterior nares and naso-pharynx. Seated anteriorly it seeks a more direct pathway to the nose by perforation of the bone.

Simultaneous or consecutive ulceration of the palate, pharynx, and nose seems to be characteristic of syphilis.

The next most common seats of ulceration, in the order of their frequency, are the fances, the naso-pharynx, the posterior pharyngeal wall, the nasal fossæ and septum, the tongue and gums.

A peculiarity of these ulcers, and especially those of the palate, is their centrality of position. They are generally found in the median line of the vault, at the junction of the palatal processes of the superior maxilla, and the areas of destruction on either side are equal and symmetrical.

Often more acute in their development, and advancing with more rapid strides than in the tertiary syphilis of the adult, the special tendency of these ulcerations is to attack the bone and lead to caries and necrosis. Disorganization of the bone occurs in over three fifths of recorded cases. The great vascularity of the periosteum and medullary membrane in youth, doubtless, invites invasion of the osseous structures. This, however, is contrary to the experience of Colles (*Venereal Diseases*, p. 271, London, 1837), who never saw a case; of West (*Lectures on Diseases of Children*, p. 747), who has seen necrosis only once; of Holmes (*op. cit.*, p. 351), who has seen sloughing of the soft palate, but not excavated ulcers or caries of the hard palate; and of Cooper Foster (*Surgical Diseases of Children*, p. 291, London, 1860), who has never met with an example in which syphilis had advanced to disease of the bone.

The tendency to necrosis exists at all periods of life, but especially in early youth, at which time it is more destructive and less amenable to treatment. When ulceration occurs on the hard and soft palate, perforation of these structures takes place in very nearly one third of the cases.

As a rule, the ulcers originate upon the palate or within the pharynx, but they are also consecutive to deep, ulcerating syphilides of the nose and face. Whatever their point of departure, the palate is often the structure upon which the destructive process ultimately descends.

The palate, pharynx, and nose, then, constitute a well-defined territory singularly obnoxious to these ulcerative products, and within whose confines we may best study the development and growth of these degenerate lesions of syphilis.

Ulceration of the tongue occurs in a certain proportion of cases. I have met with it three times in congenital syphilis. In the first case the ulcer was situated on the right side of the tongue, near its tip; in the second, in the left glosso-epiglottic fossa; while the third followed the breaking down of a large granula on the upper surface of the tongue near its base.

The ravages of the disease present the typical appearances that are found in the tertiary syphilis of the adult. The appearance of the ulcer will vary to a certain extent with the general condition of the patient. In a badly nourished, cachectic child the granulations may assume a pale, unhealthy, and indolent look, and the red corona may fade into a purplish ring, or even be entirely wanting. But in all there is a strict adherence to the true syphilitic type of ulcer.

As a result of cicatrization, adhesions may form between the velum and the pillars of the fauces, or between the latter and the pharyngeal wall, and there may be stenosis and obliteration of the pharynx and naso-

pharynx; in fine, all the sequelæ are found which follow constitutional syphilitic ulceration in these localities.*

Prognosis in syphilis of the pharynx is generally good, provided the patient be seen before extensive destruction has taken place. In congenital syphilis it is greatly influenced by the age of the patient; the earlier the pharynx is attacked the graver the prognosis. Pharyngolaryngeal ulceration occurring within the first year is almost invariably fatal. Pharyngeal ulceration appearing late, or as a manifestation of "tardy syphilis," yields readily to iodide of potassium, and the topical application of iodoform or the vapor of the iodate of zinc.

Diagnosis.—The separation of syphilitic ulceration of the pharynx from that of tuberculosis, lupus, lepra, and cancer should be made upon the principles of differential diagnosis laid down in the article on Syphilis of the Larynx. It should not be forgotten, too, that typhoid fever, diphtheria, and other acute systemic disorders may lead to destruction which resembles that of syphilis so closely as to render an appeal to the history of the case imperative. The soft palate and pharynx may also be destroyed by traumatic causes, or be badly scarred from chemical irritants. Sloughing may also occur from poisonous doses of drugs, such as mercury in its various forms.

Treatment.—This should be carried out on the principles indicated in the section on Syphilis of the Larynx. In my experience the best application to the mucous patch is the solid stick of silver nitrate, while for the tertiary ulcer iodoform may generally be relied upon as a rapid promoter of cicatrization. Adhesions may be divided with the knife or galvano-cautery, but unless serious interference with function is threatened they had better be left alone. Partial stenosis of the upper and lower pharynx may be treated by systematic dilatation with sounds, by divulsion, or by the use of the cautery or knife. When the stenosis is complete, and the pharynx is filled with dense fibroid tissue, the treatment will depend upon the circumstances of the case and the ingenuity of the surgeon. In cutting through the new-formed tissue in the nasal pharynx, it is always best to previously introduce a catheter or similar contrivance through the nose, upon which to cut as a guide. The results of treatment in this class of cases can not be said to be brilliant. The tendency to recurring stenosis is great, and the surgeon is fortunate who obtains a satisfactory permanent opening. Delavan, of New York, profiting by the observation of Andrew H. Smith—that the eschar after the use of monochloroacetic acid remains attached until cicatrization has taken place beneath it—in a case of adherent velum, divided the adhesion with

* The views and conclusions given above were first published by the writer in the American Journal of the Medical Sciences for October, 1880.

curved scissors and cauterized the raw surfaces freely with this acid. Although the surfaces remained in contact, no adhesion took place afterward, and the operation was a permanent success (Transactions of the American Laryngological Association, 1883, p. 185).

III. SYPHILIS OF THE LARYNX.

Statistics differ widely as to the frequency with which syphilis attacks the larynx. While the space allotted to the present article precludes a critical examination of the sources of error discoverable in the antagonistic reports of different observers, it may be said, in general, that reconciliation of diverging opinions upon this subject can only be accomplished by taking the life histories of the cases upon which the statistical evidence is based. Were this method universally adopted, we believe that few syphilitics would be found who had not, at some period or other of the disease, suffered from some form of laryngeal affection.

The delicate structure of the larynx, the irritation to which it is exposed in the natural discharge of function, or in the unnatural exercise of the same from disease of adjacent and communicating organs, as the nose and pharynx, the common invasion of its structures in other forms of acute and chronic blood-poisoning, and its frequent exposure to a host of other unfavorable influences from direct or reflected irritation, furnish, *a priori*, grounds for regarding this organ as a frequent seat of the manifestations of constitutional and hereditary syphilis. The impairment of nutrition induced in its structures by the circulation within their substance of a vitiated fluid, and the consequent vulnerability of its mucous membrane to the causes that determine catarrhal conditions, predispose, among other things, to the phases of so-called secondary inflammation, while its wealth in fibrous tissue and fibro-cartilage doubtless invites invasion by the tertiary processes of the disease.

While it is therefore probably true that the majority of cases of constitutional or hereditary syphilis, if untreated or neglected, will sooner or later develop some phase of laryngeal disorder, it is equally certain that the eruption of the disease in the larynx can be prevented or modified by early therapeutic interference. As the virulence of syphilitic lesions in general is modified by the employment of the more advanced and rational methods for its cure, so the destructive affections of the larynx are less frequently met with now than in the time when the therapeutics of the disease were less perfectly understood, and when the exhibition of mercury to salivation was the catholicon of the profession.

Certain it is that the proportion of the more destructive forms of laryngeal syphilis is small, compared with their constancy and the terrible ravages to which they gave rise, as described by the writers of the fif-

teenth and sixteenth centuries. While, therefore, it is safe to affirm that the proportion of cases of laryngeal disease in syphilis has been notably diminished by the rational use of mercury, and especially by the tonic treatment of the disease, as formulated by Keyes (American Jour. of Med. Sci., January, 1876; also Tonic Treatment of Syphilis, New York, 1876), the injudicious use of that drug, on the other hand, may be looked upon as having contributed in the past in no small degree to the determination of the disease to the throat. For when we recall the extensive ulceration of the pharynx and larynx sometimes produced by mercurials, and the free way in which the latter were often administered (Colson, Journal Hebdom., 1831, p. 36; also Crampton, Trans. Dublin Coll. of Phys., vol. iv, p. 91, where two grains of calomel caused ulceration of the throat and death; and Devergie, Archives gén. de méd., tom. ix, p. 468, gangrene of the throat and death; also a case, Broadbent, Mem. of Lond. Med. Soc., vol. v, p. 112, in which globules of mercury were found upon the laryngeal cartilages after death), it is easy to conceive of the disastrous influence of their incautious administration upon structures peculiarly obnoxious to the ulcerative forms of syphilis.

The time elapsing between inoculation and invasion of the larynx varies greatly. Lewin (Die Behandlung der Syphilis mit Sublimat Injectionen, Berlin, 1869; Ziemssen's Encyclop., Am. ed., vol. vii, p. 862, New York, 1876), who has given this particular attention, asserts that the minimum period is from two and a half to three months; while in the well-known case of Türk the laryngeal affection developed thirty years after infection (*op. cit.*, p. 377).

The rarity of primary inoculation of the pharynx and tonsils precludes the framing of any definite conclusions concerning the rapidity of subsequent laryngeal invasion, nor has any relationship been established between the severity of the respiratory lesions and the size of the primary sore. Reasoning by analogy, however, it might be said that an early invasion of the larynx may be looked for in primary disease of the tonsils, and that the destructive tendency may vary with the character of the initial lesion.

The laryngeal lesions of syphilis are superficial and deep. Superficial changes usually appear early during the secondary stage of the disease, while the deeper, destructive lesions occur later, in the period of tertiary phenomena. The laryngeal inflammation is therefore, as a rule, associated with the corresponding external phenomena of these periods.* This relationship between the laryngeal and cutaneous lesion is, however, by

* M. Dance has attempted to show that roseola, and even the tubercular and papular syphilide, occur in the larynx simultaneously with their eruption upon the external surface (Eruptions du larynx survenantes dans la période secondaire de la Syphilis, Paris, 1864). These observations have never been confirmed.

no means invariable, especially as regards the superficial lesions, and even deep ulceration may be met with at an early period of the disease.

It sometimes happens that laryngeal inflammation and ulceration appear many years after the constitutional malady has run its course, and the lesions of the pharyngo-laryngeal tract are occasionally encountered without antecedent cutaneous or visceral changes. In several cases seen by me, it was from the appearance of ulceration in the larynx that the patients and their attendants first became aware of the previous existence of the initial lesion. This remarkable tendency of syphilitic lesions to make their appearance in some portion of the upper respiratory tract long after the affection has apparently run its course, or without antecedent cutaneous and visceral phenomena, is especially worthy of note, and also the fact of their isolation, under these circumstances, in the nose, pharynx, larynx, or trachea, without disease of adjacent or communicating organs. Syphilis of the larynx is generally consecutive to inflammatory changes in the pharynx or nasal passages, but occasionally occurs as an independent affection. In rare instances it is the result of extension from the trachea. The age at which the disease appears will depend, of course, upon the time of infection, and as men are more disposed to the exciting causes of inflammatory affections of the larynx, it is more frequently met with in the male sex.

The experience of the writer as regards the relative frequency of secondary and tertiary lesions is in favor of the more common occurrence of the former, if the simple catarrhal affections of that period be included under the head of true syphilitic phenomena.

Varieties.—The lesions of laryngeal syphilis are pathologically separable into two main groups, corresponding to the secondary and tertiary periods of the constitutional affection. In addition to these, there is a class of case which can not be assigned to either extreme, and which belongs to what Whistler (*Lectures on Syphilis of the Larynx*, London, 1879) has aptly termed the “intermediate” period.

I. Lesions of the Secondary Period.—In this stage the mucous membrane and submucous tissues are the structures involved, and the appearances consist either in transient or permanent hyperæmia, or in well-defined catarrhal inflammation. The former presents nothing characteristic; the latter is differentiated from simple inflammation by the less pronounced character of the hyperæmia, and by the tendency to multiple superficial ulceration. There is, however, nothing absolutely characteristic in the anatomical appearances of this form of syphilis. The mucous membrane is, as a rule, paler than normal, sometimes even almost white, and the presence of minute ulcers, especially in number, and associated with similar appearances in the pharynx, is of value in the anatomical diagnosis of syphilis.

In the laryngoscopic image the existence of a brownish-red mottled appearance of the vocal cords, especially if the condition be symmetrical, together with erosions or superficial ulceration of the edges of the vocal cords, on the free border and posterior surface of the epiglottis or ventricular bands, should lead to a suspicion of the specific nature of the inflammation.

While these appearances furnish strong presumptive evidence in favor of the existence of syphilis, it were more prudent to look for other phenomena and historical data before giving a decided opinion. The ulcers of this period are either follicular in origin or result from the breaking down of the more superficial portions of the mucous membrane. These minute losses of substance often coalesce to form a large ulcer with well-defined, elevated wall and grayish-mottled base, which in healing leaves a small, somewhat depressed cicatrix. This latter, from a clinical standpoint, offers weighty evidence in favor of syphilis. Whether ulceration of the laryngeal mucous membrane ever results from inoculation by the pharyngeal secretion can not be affirmed with any degree of positiveness.

Mucous Patches and Condylomata.—The utmost confusion prevails concerning the occurrence and frequency of mucous patches in the larynx. While their existence in this organ is strenuously denied by some who have specially investigated this subject, the very opposite opinion is entertained by equally competent observers. In a large number of patients with laryngeal syphilis that have come under the observation of the writer, he recalls but one case concerning the nature of which there could be little doubt.* The failure to detect the presence of mucous patches in the larynx may be due, as Morell Mackenzie (*Diseases of the Throat and Nose*, vol. i, p. 356, London, 1880) observes, to their fleeting character; while, on the other hand, it is highly probable that many of the so-called mucous patches described by writers are in reality nothing more than papillomatous excrescences or small ulcerating gummata.

The laryngeal mucous patch, so called, appears in the mirror as a grayish-red or whitish-yellow elevation, rounded or oval in contour, and surrounded by an inflammatory areola. This may disappear completely, or disintegration and ulceration may ensue. Small papillary hyperplasiae not infrequently occur in the neighborhood of existing ulcerations or on the confines of an old cicatrix, which should, however, not be confounded, as has been done, with true condylomata.

* The subject was a woman suffering from secondary syphilis. On the left vocal cord, about its center, was a small, oval, yellowish-white patch, smooth in contour, and slightly elevated above the surface of the cord. Its long diameter was parallel with the free border of the cord, and its base surrounded by a scarlet inflammatory areola. The laryngeal membrane was slightly erythematous. Three days after this both patch and areola had disappeared.

II. Lesions of the Intermediate Period.—These have been well described by Whistler. The anatomical peculiarity of this stage resides in a chronic diffuse laryngitis, characterized by its constant tendency to relapse, and by the existence of ragged ulceration of the vocal cords. The ulcers, in fact, represent, so to speak, a transition stage from the superficial destruction of the secondary to the deeper and more malignant ulceration of the tertiary period.

The ulceration of both the secondary and intermediate periods occasionally extends to the fibro-cartilaginous structures, but the latter complication is much more frequently due to ulceration of tertiary development.

III. Lesions of the Tertiary Period.—In this stage all the structures of the larynx may be involved, singly or in combination. The propensity of syphilis to attack those cartilages only that are invested with perichondrium applies with especial force to the cartilaginous structures of this organ. The characteristic lesions of this period are gummata, deep ulceration, and fibroid degeneration.

1. *Gummata* appear as solitary or multiple tumors of varying size and shape, and of smooth, regular contour, which may proceed from any of the laryngeal structures, but which are usually found in the submucous tissue of the free border and posterior surface of the epiglottis and the interarytenoid space. They are occasionally met with in the subglottic region, on the ventricular bands and on the vocal cords. They vary in size from that of a mustard seed to a tumor that calls for tracheotomy.

The color of the mucous membrane covering the gumma is at first intensely red, and occasionally small vessels are developed in its vicinity. Gradually, under the increased pressure of the submucous deposit, it becomes pale, thin, and transparent, so that the peculiar yellow or whitish-yellow color of the gummatus infiltration is distinctly visible. Necrosis of the anæmic membrane soon follows, and an ulcer results which rapidly invades the submucous tissues, forming a more or less craterlike excavation, not infrequently involving the perichondrium and underlying cartilage. In small gummata absorption of the infiltration may be secured by the exhibition of antisiphilitic remedies, even after considerable thinning of the mucous membrane has taken place.

In histological structure the laryngeal gumma does not differ from similar products in other parts of the body.

An isolated case is on record in which giant cells were found in the gummatus infiltration of the larynx (Browicz, *Centralblatt f. die med. Wissenschaft*, 1877, S. 346), but this is probably an exceptional and accidental occurrence.

Well-defined gummatus tumors of the larynx are comparatively rarely met with as compared with diffuse syphilitic infiltration.

2. *Fibroid Degeneration*.—In the later stages of tertiary syphilis there is in a certain proportion of cases a decided tendency to the gradual development of fibroid tissue in the structures of the larynx, which tends to diminish the lumen of the organ, not only by contraction of the new-formed tissue but also by the production of large, dense, fibroid tumors, which are often mistaken for and described as gummy tumors, but which pathologically have nothing in common with them. These fibroid tumors appear as hard, nodular masses occupying the epiglottis, aryepiglottic folds, and other portions of the vestibule and subglottic region. Sometimes the greater portion of the organ is converted into a dense hypertrophic mass. Acute ulceration occurs, and is fraught with great danger from accompanying œdema, and each succeeding attack of ulceration favors a greater deposit of fibrous tissue and increases proportionately the gravity of the case. In this variety of laryngeal syphilis, which Whistler has especially insisted upon, no retrograde metamorphosis takes place; its processes are essentially progressive, and the caliber of the larynx becomes diminished sooner or later by an irregular nodular mass—half hypertrophied tissue, half cicatricial bands—which does not subside under internal or local treatment, and which, if extensive, demands tracheotomy.

These fibroid tumors may be differentiated from gummata by their pale, grayish or whitish appearance, by the surrounding anæmia of the mucous membrane, and by the absence of the peculiar yellowish submucous discoloration of the latter. The hard, dense sensation communicated to the probe contrasts forcibly, too, with the soft elastic feel of the gummy growth.

This class of case is only seen in hospital or dispensary practice, and presents a long history of neglected laryngeal trouble with gradually increasing obstruction to respiration. These tumors are more common than is generally supposed, and probably constitute a large proportion of the specimens which are labeled “gummata” in anatomical museums and collections.

Sections of the growths show, under the microscope, thickening of the mucous membrane, a round-cell infiltration of the submucous tissues, and abundant meshes and wavy bands of fibrous tissue, which, in contracting, obliterate more or less completely the vessels and glandular elements of the parts. Whether this fibrous tissue starts from the perichondrium or submucous layer, or both, or what relation it bears to the fibroid hyperplasia which are found after the cicatrization of ulcers, has not as yet been made out, but it is not improbable that this hypertrophic syphilitic laryngitis may be due to the combined action of these different factors.

3. *Tertiary Ulceration*.—Ulcers of the tertiary period result from atrophy of the mucous membrane, through the pressure of the underlying infiltration and the consequent purulent degeneration of the latter, and in

this way excavations are formed of more or less circular outline, with a deep base of grayish or lardaceous appearance, and with elevated, clearly defined, and often bloodshot walls, surrounded by a scarlet zone of inflammation, and covered with a foul, dirty yellowish secretion, which imparts to the breath a peculiar and somewhat characteristic odor.

Of varying sizes, the tertiary ulcer may be multiple, and occur in any portion of the larynx and subglottic space; but it is generally solitary, and occupies by preference the lingual surface and the free edge of the epiglottis. It may be said that, in general, the ulceration of the upper part of the larynx is much more common than ulceration of the cords and subcordal region. The ulcerative process not infrequently extends along the aryepiglottic fold to the ventricular band, or from the latter to the ventricles. The epiglottis may present a crenated appearance like the comb of a cock, or a punched-out aspect; or it may be depressed in various other ways. Occasionally it is perforated. It may be reduced to a mere rudiment, or finally be completely destroyed.

Syphilitic ulceration of the larynx heals by peripheral cicatrization, as has been well described by Virchow. Around the borders of the ulcer dense, callous connective tissue makes its appearance, which is characterized by excessive peripheral growth, as in the cicatrix following a burn. The resulting scar varies in appearance, according to the size and situation of the original ulcer. On the ventricular bands and free surface of the epiglottis it is generally star-shaped, while in other situations fibrous bands are formed which connect them with, or bind them down upon, adjacent structures.

As the ulcers heal there spring up at the periphery of the cicatrices small papillary or fibroid hyperplasiæ, and thus, later on, small areas are found decked with growths which mark the site of past ulceration.

The deformities which result from the cicatrization of large ulcers are quite characteristic. The epiglottis may be bound down to the base of the tongue, to the lateral and even posterior pharyngeal wall, adhesions may form between its free



FIG. 5.—Inherited tertiary syphilitic stenosis of the larynx. The ventricular bands converted into two enormous tumor-like bodies which have invaded and blended with the aryepiglottic folds, and which have become adherent in the middle line from union of opposed ulcerated surfaces, *a*, *b*. The stenosis is rendered almost complete by a gummatous deposit in the meso-arytenoid commissure, *c*. The dark space just above this deposit (*d*) represents all that remains of the normal lumen of the larynx. (From nature.)

edges and the aryepiglottic fold, between the latter and the ventricular bands and pyriform sinuses, and between the free edges of the ventricular bands; or the whole interior of the larynx may be converted into a contracted cicatricial channel in which all trace of the original anatomy of the part is lost (Fig. 5). Occasionally the larynx as a whole is displaced, or individual parts are thrown into unnatural positions by the contraction of the new-formed tissue. When ulceration occurs on surfaces that are brought in contact in the natural exercise of function—as, for example, the vocal cords—membranous formations composed of cicatricial tissue are occasionally developed between the opposing ulcerative surfaces, thus forming a web between them—a condition which has been especially well described by Elsberg (*Syphilitic Membranoid Occlusion of the Rima Glottidis*, New York, 1874).

If cicatrization be not promoted, the ulcers rapidly descend to the perichondrium, purulent inflammation of that structure is established, and the cartilage laid bare.

Perichondritis and necrosis of the cartilages may also develop as a primary affection—possibly, though rarely, as a metastatic (septic) inflammation of the fibro-cartilaginous tissue. The cartilage thus becomes surrounded by a purulent infiltration, which takes place beneath and in the meshes of the perichondrium, caries occurs, and the necrotic portions are expelled as a granular detritus or as well-formed sequestra. Sometimes an entire cartilage is expelled in the effort to expectorate. While expulsion of necrotic cartilage usually takes place by the mouth, it occasionally happens that the necrosed plate falls into the trachea and causes death. The entire epiglottis has also been found in the stomach.

The presence of necrotic cartilage in the larynx, apart from other dangers to which it may give rise, aggravates the existing local disease, increases suppuration, and may even lead, if not artificially extracted, to metastatic abscesses in various parts of the body, to pyæmia and death.

If perichondritis does not result fatally, recovery takes place, at the expense of the functions of the larynx, with permanent ankylosis, with consequent paralytic affections and diminution in the caliber of the larynx, or fistulous tracts may be established between the cartilage and interior of the larynx, or may connect the former with the external surface.

A remote danger from tertiary laryngeal ulceration is death from hæmorrhage, as in the classical case of Türk (*Klinik der Krankheiten des Kehlkopfes*, 1866, S. 413), in which the laryngeal artery was opened, and in the one mentioned by Rokitsky (*Path. Anat.*, Bd. iii, p. 22), in which sudden death occurred from perforation of the aorta.

In all forms of tertiary syphilis of the larynx and in the deeper ulceration of the secondary and intermediate periods there is a tendency to

acute and chronic œdema. The former occurs suddenly, and is sometimes the immediate cause of death; the latter develops slowly, and in some instances without danger to life, while in others it causes progressive dyspnoea, which may terminate fatally by sudden increase of the serous infiltration.

Symptoms and Complications.—It is manifest, from the above, that the symptoms and complications of laryngeal syphilis are of the most varying nature, and may consist in very slight modification of the vocal and respiratory functions or in their complete destruction; and even, secondarily, abrogation of the process of deglutition.

Diagnosis.—The distinctive points of difference between the diffuse laryngitis of the secondary period and simple catarrhal inflammation have been already given. The older writers laid great stress upon a peculiar raneous character of the voice as diagnostic, and the *vox rauca syphilitica* was placed among the pathognomonic symptoms of the disease. This quality of the voice is, however, met with when the vocal cords are congested, thickened, or abraded from simple inflammation, and can not, therefore, be looked upon as characteristic of syphilitic laryngitis; though it may be of value in differentiating the latter from tubercular inflammation.

In the earlier laryngeal affections of tuberculosis the pronounced palor of the mucous membrane of the pharynx, larynx, and nasal passages, the tendency to swelling and congestion of the posterior and inferior portions of the larynx, together with a hyperæsthetic condition of the upper air-passages, and especially the pharynx, and the slow development and persistence of the ulcers (generally on the vocal processes), will lead to an examination of the lungs, where evidences of commencing consolidation are generally to be found. In doubtful cases, in which such evidence is wanting at the apices, I have repeatedly discovered signs of a localized bronchitis between the scapulæ, and the diagnosis has been verified by the subsequent development of the case.

Tertiary syphilitic ulceration of the larynx, and that which occurs in the intermediate period, may be confounded with that of tuberculosis and carcinoma.

From tuberculosis it may be differentiated by attention to the following points: Syphilitic ulcers are usually single, develop rapidly, and are preceded or accompanied by localized unilateral swelling of the mucous membrane or by gummatous growths. Tubercular ulcers, on the other hand, are generally multiple, are slow in development, and are preceded, as a rule, by a peculiar lusterless, opaque thickening of the membrane (tubercular infiltration). This may, in turn, be distinguished from the œdema which complicates syphilis, in that the latter is commonly unilateral, or confined to the parts principally affected, is glistening, more or

less translucent, and does not partake of the opaque, dull color of tubercular deposit. When the latter leads to the peculiar pyriform swelling of the aryepiglottic folds or to the turban-shaped epiglottis, it furnishes almost pathognomonic proof of tuberclosis. Syphilitic ulcers are larger, as a rule, than tubercular ulcers, and their favorite seats are the anterior surface and free edge of the epiglottis, while tubercular ulceration is most frequently encountered in the lower and posterior portions of the larynx and on the ventricular bands. When tuberclosis attacks the epiglottis it is generally the lower and posterior surface that is involved, and it may be said, in general, that the tendency of syphilitic ulceration is to develop from above downward, that of tuberclosis from below upward. Bilateral ulceration of the larynx, and especially of opposing surfaces, other things being equal, is in favor of tuberclosis.

Deformity always results when any of the laryngeal structures—as, for example, the epiglottis—is perforated from syphilitic ulceration, while the perforating ulcer of tuberclosis has little or no effect upon the natural shape and position of the cartilage. The syphilitic ulcer is deep, cleanly cut, with well-defined shelving walls (*vide supra*), is surrounded by an inflammatory areola, and rapidly invades the submucous tissues; the tubercular ulcer is surrounded by an anæmic mucous membrane, is more shallow, presents a characteristic, worm-eaten appearance, and tends to spread laterally in an irregular or serpiginous manner.

The secretion from tubercular ulceration is usually very profuse, accumulates with great rapidity, and gives to the breath a peculiar, sweetish odor that is quite characteristic. Microscopic examination, moreover, will generally detect the presence of Koch's bacillus, which may be looked upon as possessing a certain crucial diagnostic value. In syphilis, on the other hand, the secretion is by no means as great, nor does it accumulate with the rapidity observed in tuberclosis. Syphilitic ulceration, especially if the pharynx be involved, gives to the breath, moreover, a peculiar fetid odor, which may be regarded as diagnostic.

Hæmorrhage from the larynx is not uncommon in tuberclosis, and is rare in syphilis. Syphilitic ulceration tends to heal by peripheral cicatrization; it is doubtful whether *very extensive* tubercular ulceration ever completely heals. The presence of cicatrices in the larynx is *prima facie* evidence of syphilis, and when these assume their characteristic form there can be little doubt concerning the diagnosis.

Small fibrous outgrowths in the neighborhood of ulcers and cicatrices are additional evidence in favor of syphilis, while papillary hyperplasiæ, occurring in the interarytenoid fold and especially when they appear in the early stages or precede well-marked changes in the larynx, should awaken suspicion of tuberclosis (Stoerek, *Klinik der Krankheiten des Kehlkopfes*, etc., Stuttgart, 1880, S. 282; Major, *Trans. Am. Laryng.*

Assoc., 1883, p. 163). While, moreover, small granular or papillary hyperplasias are sometimes found covering the base of tubercular ulceration,* no growth ever rises from that of a syphilitic ulcer or from the resulting cicatrix. Papillary hyperplasias are not uncommon in syphilis, and generally mark the seat of past ulceration, as indicated by the presence of a cicatrix or other evidence of pre-existing localized destruction. The papillomatous excrescences of tuberculosis tend in time to ulcerate and break down; those of syphilis rarely, if ever, ulcerate.

Syphilitic ulceration is, as a rule, not painful, nor is the larynx tender to pressure except where the deeper structures are involved. Deglutition is also accomplished with ease, except in active ulceration of the epiglottis, when the pain is sometimes severe. In tubercular ulceration, on the other hand, especially when the food comes in contact with the ulcerated surface, swallowing is intensely painful and sometimes impossible.

In tuberculosis the respiration is always more or less embarrassed, and the voice is enfeebled and veiled, from insufficiency of the expiratory forces; while in syphilis, unless the vocal cords be involved, the phonetic quality of the voice is not necessarily impaired. In the differential diagnosis between tuberculosis and syphilis the so-called *vox rauca* may be accepted as a sign of the latter.

The presence of cicatrices or active ulceration in the pharynx, on the palate, or in the nasal cavities carries with it weighty evidence in favor of syphilis, the condition of these structures in advanced tuberculosis being commonly that of anæmia associated with more or less catarrhal disease. Extensive ulceration of the pharynx in tuberculosis is much less frequently met with than destructive lesions due to tertiary syphilis.

By attention to the above differential points between the two diseases a mistake can rarely occur. It must, however, be admitted that cases arise in which an appeal to the historical narrative of the case, the physical examination of the lungs and other organs, and even treatment, may be necessary, before giving a positive opinion. It should be remembered, too, that syphilis and tuberculosis are occasionally combined in the larynx, and that such a condition can only be recognized by the eye of a skilled observer.

The deformities which result from tertiary syphilis may be said to be practically characteristic; but it is well to call attention to the fact that certain essential fevers—e. g., typhoid, smallpox, etc., and diphtheria—

* The gummata of syphilis may possibly be confounded with tubercular tumors of the larynx, that rare form of tuberculosis first described by the writer of this article in 1882 (N. Y. Archives of Medicine, October, 1882), and of which other cases have since been recorded by Schnitzler (Wiener med. Presse, Nos. 44 and 46, 1883), Percy Kidd (Clin. Soc. Trans., London, vol. xvii, p. 154, and St. Bartholomew's Hosp. Rep., vol. xxi), and others.

occasionally give rise to ulceration of the nasal passages, pharynx, and larynx, with perforation of the septum, ozaena, loss of the palate, epiglottis, etc., which present all the gross appearances of syphilis, and which can only be differentiated from the destruction of that disease by the history of the case. This is especially worthy of remembrance, lest in the after-life of the individual the previous existence of syphilis be too readily assumed from a perforation of the septum or the loss of the uvula or palate.

Much more difficult is the differentiation of syphilis and cancerous ulceration occurring in the larynx. The chief points to take into consideration here are the following: Cancer is a disease which occurs usually after the fiftieth year of life, which develops less rapidly than syphilis, and most commonly originates from the space between the vocal cords and ventricular bands (except when it descends from the pharynx) as a more or less clearly defined nodular growth, which subsequently ulcerates and is converted into an ulcer with bloodshot walls, whose base becomes covered later with fungous, bleeding granulations. Associated with this, or preceding its development, are usually evidences of œsophageal obstruction, with pain on swallowing, pressure, or manipulation with the bougie.

Lancinating pain in the larynx, when at rest, radiating to the ear of the affected side, is often present, although it can not be considered as characteristic, as it may occur in any ulcerative disease of the larynx. As the ulcerative process of cancer advances, extensive hæmorrhages not infrequently take place—an uncommon occurrence even in extensive syphilitic ulceration.

The secretion of cancer is profuse, ichorous, and differs materially in odor from the peculiar sickening stench of the discharge produced by syphilitic ulceration. Examination under the microscope will occasionally determine the nature of the case.

Cervical, glandular enlargement is uncommon in laryngeal cancer, but is not infrequently associated with tertiary syphilis of the larynx.

While the above may serve as reliable guides to diagnosis, every experienced specialist can recall cases in which the latter could only be determined by resort to the sovereign test of treatment. Indeed, in any case in which the slightest doubt exists, it is the part of prudence in this as in other problems of diagnosis to give the patient the benefit of the doubt.

Prognosis.—The treatment of syphilitic affections of the larynx is generally very satisfactory, unless the cartilages and their envelopes be attacked. Even then a cure may be effected if the necrotic cartilage be removed. In deep-seated destruction a cure can only be obtained with permanent injury to function.

The complications and dangers to life from tertiary syphilis have already been alluded to in treating of the pathology of the disease. The possibility of the sudden occurrence of oedema, even in the ulcerative laryngitis of the intermediate period, should never be lost sight of, and the danger of the latter increases, in every stage, as the perichondrium is approached.

It is generally possible to produce complete cicatrization of tertiary ulceration, but when the latter is extensive, such an event is only accomplished with considerable deformity or contraction of the larynx. Ulceration occurring in the subglottic region and in the neighborhood of the cricoarytenoid joint is more dangerous to life than when the epiglottis and ventricular bands are attacked. The entire epiglottis may be destroyed without serious impairment of the laryngeal functions, and without impediment to deglutition.

In fibroid degeneration, when extensive hypertrophy has taken place, no good has as yet come from constitutional or local treatment, and the patient drifts sooner or later to tracheotomy. Perhaps some good could be accomplished by the use of acids, electric cantery, and other destructive measures, with or without a preliminary tracheotomy in this apparently hopeless class of cases.

If properly treated, the prognosis in simple syphilitic catarrh, with or without ulceration, is good, and a permanent cure can often be accomplished. In other cases relapses of the ulcerative process occur from time to time. In both, the prognosis is influenced by the previous timely treatment of the constitutional disease. Finally, all syphilitic lesions of the larynx are rendered less amenable to treatment by the predisposition to or coexistence of serious organic disease, as, for example, tuberculosis.

Treatment.—The treatment of laryngeal syphilis is both constitutional and local. While there is, perhaps, no disease of the larynx that calls for more careful local methods of cure than syphilis, and in which the prognosis depends so much upon the early laryngoscopic recognition and appropriate topical treatment of its manifestations, the successful accomplishment of the latter is nearly always assisted by and often dependent upon the exhibition of constitutional remedies. Especially is this true of the tertiary lesions of the disease. To neglect general antisyphilitic medication when an ulcer is approaching the perichondrium, or when the destruction of important parts is menaced, is, to say the least, an unsafe and injudicious experiment.

The development and permanency of secondary laryngeal lesions are also influenced in a great measure by the early adoption of constitutional measures, for the latter not only assist in the removal of the infiltration, but in some instances act as a safeguard against inflammatory disease.

The different methods of administration of antisyphilitic remedies

are given elsewhere in this volume. The writer can recommend the tonic use of mercury, as formulated by Keyes, in the treatment of syphilitic affections of the larynx. The most direct way of producing both the local and general effects of the drug is by mercurial fumigation or vapor baths.

The *local treatment* of the diffused laryngitis of secondary syphilis does not differ materially from that of simple catarrhal laryngitis. Should ulceration occur, iodoform may be freely used. In the deeper form of ulceration this drug is of inestimable service, and is, in the writer's experience, superior to iodine and the nitrate of silver. Sprays of the bichloride of mercury, or the local application of the yellow oxide in cosmoline, vaseline, or like substance, are also of considerable value. Before applying these remedies the ulcerated surface should be thoroughly cleansed by means of a detergent and disinfectant spray, for otherwise much of the good effect will be lost.

Papillomatous growths may be dissipated by the local application of alcohol or chromic acid, or, if extensive, may be removed at once with the forceps. Membranous webs may be successfully divided with the galvano-cautery (Elsberg) or by cutting dilators, the best of which is that devised by Whistler.

Whether any good can be accomplished by the division of adhesions must be determined by the peculiarities of the individual case. Except when function can be restored, or serious dyspnoea or dysphagia mitigated by the operation, it is better, as a rule, to let them severely alone.

Serious interference with respiration from any complication calls for tracheotomy, and the early performance of the latter is especially to be advised when the larynx has undergone the fibroid degeneration described above. Systematic dilatation of the larynx is sometimes of value, but, as a rule, little can be expected of this line of treatment beyond temporary improvement, while it is much inferior to the cutting operation.

Loosened necrotic plates of cartilage, in view of the dangerous complications to which they may give rise, should be removed, if practicable, by endolaryngeal operation or from without by exsection.

IV. SYPHILIS OF THE TRACHEA AND BRONCHI.

The individual portions of the respiratory apparatus possess a decidedly varying disposition to the localization of syphilitic lesions. When the notable frequency with which the nose and larynx are involved during the course of constitutional syphilis is contrasted with the comparative rarity of affections of the trachea and bronchi, it may be with safety said that the lesions of syphilis are more frequently found in the upper than in the lower segments of the respiratory system.

Syphilis of the Trachea.—Tracheal syphilis is of relatively rare occurrence, though not as uncommon as statistics would lead us to believe. Many cases of tracheal syphilis are doubtless overlooked, and especially is this true of those isolated inflammatory and ulcerative conditions which are found in the lower portion and at the bifurcation of the windpipe. In a large proportion of cases the tracheal affection is secondary to and consists simply in the extension downward of infiltration and ulceration of the larynx; it occasionally involves the whole length of the trachea, and even the bronchi, in its destructive action.

Much less common is the existence of syphilis of the trachea without associated or pre-existing lesions of the larynx and pharynx, or at least which is not the result of extension, but which occurs as an independent affection. When the syphilitic disease is thus isolated it is usually in the lower third of the trachea, from which it extends into the bronchi, or the latter may themselves be the seat of isolated syphilitic lesions.

Isolated syphilis of the upper third is much less commonly met with, and may occur alone or in combination with lesions of the lower trachea and bronchi. Usually both bronchi are affected. When one alone is involved it is more frequently the right. Only two cases are on record of isolated syphilis of the windpipe in its entire length (Zurhelle, *Berliner klin. Woch.*, 1872, No. 35; Wilks, *Guy's Hosp. Rep.*, ix, 1863), while the isolation of the disease in the middle third is so rare that the possibility of its existence in this locality has been denied. This condition has, however, been found and described by the writer (*Wiener med. Jahrbücher*, 1881, i. Heft. p. 75 *et seq.*) of this article, who at the time of publication could find but two similar cases in literature (Charnal, *L'Union Médicale*, 1859, No. 21; Beger, *Deutsch. Arch. f. klin. Med.*, 1879, S. 608), to which a fourth has been added by Felix Semon (*London Lancet*, vol. i, pp. 905, 906, 1882).

Pathological Anatomy.—The changes met with in the trachea are identical with those found in the larynx during the secondary and tertiary period, with certain differences of appearance due to peculiarity of anatomical structure.

Mucous patches in the trachea are liable to be overlooked. Morell Mackenzie (*Diseases of the Throat and Nose*, vol. i, p. 531, London (1880)), states that he has found them five times. Seidel (*Jenacr Zeitschr. f. Med.*, 1866, S. 489, Canstatt, 1866, S. 497) described as a mucous patch a pale-red excrescence, the size of a pea, which was associated with condylomata in other parts of the body, and which disappeared without local treatment. Diffuse superficial inflammation, with or without ulceration, fibroid degeneration, gummatous growths, deep ulceration involving the perichondrium and cartilages, leading to peritracheal abscesses, exfoliation of necrotic tissues with subsequent fistulous communi-

eration with the exterior, membranous formations and stricture from the cicatrization of ulcers, are all observed, either alone or combined in the course of constitutional syphilis.

The ulceration generally descends from the larynx along the inner surface of the tube, presenting a more or less irregular spiral form or peculiarly forked appearance. In other cases the long diameter of the ulcer is at right angles to that of the trachea, which it surrounds in a circular manner. Usually single, the ulcers vary in size, sometimes extending the whole length of the tube, and even to the first division of the bronchi.

The stenosis which follows the contraction of the cicatricial tissue may affect the tube as a whole, whose lumen it sometimes obliterates almost completely, or the obstruction may be confined to its individual segments. The most common seat of obstruction is the lower third.

An extreme degree of stenosis occurred in a patient of mine at the Johns Hopkins Hospital. The young man had had a chancre five years prior to consulting me, and for eighteen months had suffered from gradually increasing dyspnoea. I found bilateral paralysis of the abductor muscles. He was sent at once to the hospital, where tracheotomy was done by the house surgeon, but no relief was obtained. The dyspnoea grew progressively worse, and expiratory dyspnoea was added to the inspiratory difficulty. This indicated obstruction below the seat of operation. The patient sank, and in a few days died. On post-mortem examination, made by Prof. Welch, no trace of syphilis

was found in any part of the body except in the respiratory organs. In the apex of one lung a large gumma was found. Both recurrent nerves were compressed, and were found in a mass of half-cicatricial tissue and half-enlarged glands. There was pressure on both recurrent nerves, and the trachea at its bifurcation was so narrowed by the gummatous infiltration and contraction following ulceration that it was with the greatest difficulty that a very fine probe could be forced through the stricture. There were other ulcers in a state of cicatrization in the neighborhood. Certain fibers of both recurrent nerves were in a state of fatty degeneration.

The starting point of all the trouble seemed to be the gummy deposit in the lung.

The stricture which results from the cicatrization of a tracheal ulcer is of two kinds—excentric (Fig. 6) and concentric. The former is produced

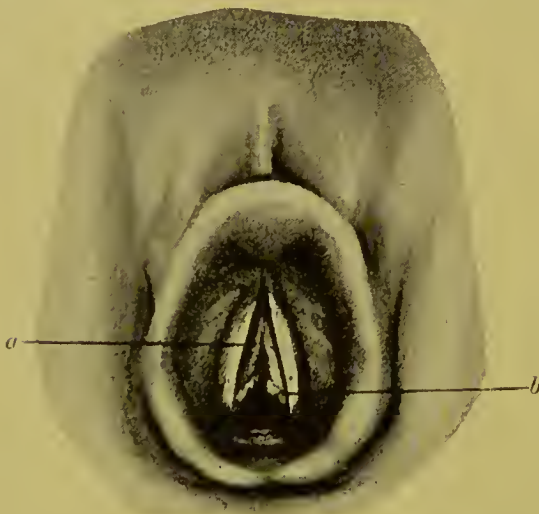


FIG. 6.—Excentric stricture (syphilitic) of the trachea. *a*, cicatricial subglottic tracheal web; *b*, fibrous outgrowth. (Drawn from nature by Dr. J. R. Winslow.)

by irregularities or deformities of the tube from the healing of longitudinal or imperfectly annular ulceration, or as the result of perichondritis. In annular or concentric stricture there is often dilatation of the trachea above and below the constriction, forming, so to speak, an hour-glass appearance. The cicatrices do not differ materially from those found in the larynx. They either present a peculiar netlike form, or resemble the scars found in the œsophagus from corrosions (Förster). In one of my cases the cicatrix presented a remarkable resemblance to a sheaf of wheat.

Prognosis.—The prognosis of tracheal syphilis is, other things being equal, much less favorable than when the disease attacks the larynx, and it becomes graver as the bifurcation into the bronchi is approached. Extensive ulceration, especially when occurring in the lower third, or when it involves the bronchi, is generally fatal; while in obstruction in the upper third life may be prolonged by resort to tracheotomy or to systematic dilatation. In addition to the usual dangers from stenosis, perichondritis, etc., death has been known to occur from hæmorrhage, due to perforation of the ulcer into the aorta (Rokitansky, *Patholog. Anatomie*, Bd. iii, p. 22; Wilks, *Trans. Path. Soc.*, vol. xvi, p. 52), and into the pulmonary artery (Gerhardt, *Arch. f. klin. Med.*, vol. ii, p. 541; Kelly, *Trans. Path. Soc.*, vol. xxiii, p. 45). In other cases the ulcer has perforated into the mediastinum (Wallmann, *Virchow's Archiv*, Bd. xiv, p. 201) and into the œsophagus (Beger, *loc. cit.*, and Axel Key and Oscar Sandhal, cited in Schmidt's *Jahrbüch.*, 1870, 147, p. 48).

Symptoms.—Syphilis of the trachea may run its course without the production of any symptoms during life, or it may give rise to those of the most alarming and dangerous forms of stenosis.

CONGENITAL SYPHILIS OF THE LARYNX, TRACHEA, AND BRONCHI.

Isolated cases of laryngeal lesions in congenital syphilis are to be found scattered here and there through medical periodicals, but systematic writers have either entirely ignored the subject, or referred to a few recorded cases as pathological curiosities. The universal sentiment of authority has, until quite recently, been decidedly adverse to the frequent dangerous implication of the larynx, and the changes in the voice* are referred to the intervention of fortuitous catarrh.

* As early as 1837, Dr. Abraham Colles, of Dublin, called attention to a hoarse cry as a symptom of congenital syphilis, and referred to the fact that when the voice became hoarse the affection of the anus might be shortly expected (*Pract. Observ. on the Venereal Disease*, etc., London, 1837, p. 269). Rosen, a distinguished Swedish physician, is cited by Mahon and Lamaue (*Recherch. importantes sur l'existence, la nature et la communication des mal. syph.*, etc., p. 371, Paris, 1804) as mentioning a hoarseness occurring without manifest cause, and difficult deglutition, as symptomatic of congenital syphilis; but, on referring to the English translation of Rosen's work, I find that the sentence relates not to the inherited syphilis of the child, but to the acquired disease in the nurse (*The Dis-*

In the American Journal of the Medical Sciences for October, 1880, I called attention to the frequency with which the throat is involved in congenital syphilis, and gave a systematic description of the lesions found in the pharyngo-bronchial tract and œsophagus during the course of that disease. In opposition to the then generally received doctrine, I ventured to maintain, as the result of careful investigation of the subject, that, so far from being rare, as was generally supposed, laryngeal affections in congenital syphilis are among the most common and characteristic of its pathological phenomena, and that the invasion of the larynx may be looked for with the same confidence in the congenital as in the acquired form of the disease. Further experience, and the study of cases since recorded by others, have only served to strengthen the positions taken in the paper referred to; for an elaborate discussion of which I must refer to the original, from which also the following account is taken:

The laryngeal lesions of congenital syphilis are constant and characteristic, and play an important rôle in the pathological evolution of the disease. Often among the first events of its clinical history they may rapidly terminate in death, or stealthily advance, inducing progressive morbid changes, which, at first controllable and evanescent, may ultimately become inveterate. And thus the laryngeal inflammation may outlive the series of phenomena which mark the progress of the malady, witnessing their inception, course, and disappearance, itself alone rebellious to the approaches of the treatment by which they have been controlled or dissipated.

The larynx may be involved at any, but usually at an early, epoch. Laryngitis may even arise during intra-uterine life. The most common period of invasion, however, is within the first six months after birth. Out of seventy-six cases of laryngitis, fifty-three occurred within the first year; and of these, forty-three within the first six months, seventeen within the first month, and four within the first week of life. Age, therefore, seems to exercise a predisposing influence upon the eruption of the disease in the larynx. This applies not only to the superficial changes, but also to the more malignant forms of laryngeal destruction.

The laryngeal affection is met with more frequently in the female than in the male sex, in the proportion of three to two. It develops at

eases of Children and their Remedies, by Nicolas Rosen von Rosenstein, translated from the Swedish edition of 1771 by Dr. Andrew Sparrman, p. 332, London, 1776). Long before Colles wrote, Josef Jacob Plenck, in speaking of the signs of inherited syphilis, observes that not infrequently the fauces and labial commissures become exulcerated—a condition indicated by a rough voice, nocturnal cries, sleepless nights, etc. “Non raro fauces et commissuræ labiorum simul eroduntur. Index vox rauca, clamores nocturni, noctes insomnes, deglutitio difficilis, tabes, mors” (Doctrina de morbis veneris, p. 149, Viennæ, 1779). This writer also refers to ulceration of the fauces in “latent” syphilis.

all periods of the year, without regard to season, although it is naturally aggravated by those atmospheric changes that determine catarrhal conditions.

Imperfect nutrition and forced neglect of hygienic laws sufficiently explain its prevalence among the children of the poor.

The classification of the laryngeal lesions of congenital syphilis into secondary and tertiary will not obtain, as in the case of acquired disease. Their pathological evolution is not governed by the same laws that regulate the eruption of syphilis in the adult larynx, nor can we predicate, in any given case, the order in which they will appear. In some, not a few, the deeper destructive forms are the first indication of laryngeal mischief.

In congenital syphilis we may distinguish two principal varieties of laryngeal inflammation. In the one the changes are limited to the mucous membrane, and it may be the submucosa; its march is essentially slow, and there is little tendency to invasion of the deeper structures. The other is characterized by deep ulceration of an extremely acute nature, which, especially in early life, rapidly involves the cartilages and their envelopes, and constitutes the most frightful form of the disease. In addition to these, there is a third form, in which a gradual deposit of dense fibrous material takes place within the tissues of the larynx, and leads to contraction of its lumen.

These pathological facts justify a classification based upon the anatomical seat of inflammation. The laryngeal lesions may accordingly be classified as *superficial*, *deep*, and *interstitial*.

Chronic superficial laryngitis is the condition most frequently met with. It is limited to the mucous membrane and submucosa, is essentially chronic, runs a definite course, gives rise to well-defined changes in the larynx, and may be divided into three stages. The first, or stage of hyperæmia, presents nothing diagnostic; the redness is generally diffuse, but sometimes is confined to special areas. It is commonly associated with congestion of the trachea, coryza, and erythema of the fauces and pharynx. Gradually, however, a condition of hypertrophy is developed in the laryngeal membrane, which becomes swollen, thickened, and infiltrated, constituting the second stage, or that of infiltration and hypertrophy. If the larynx be examined now, its membrane will be seen to be deeply injected, and often slightly translucent from chronic inflammatory œdema. The epiglottis, ventricular bands, and arytenoids have a swollen, rounded appearance, while the vocal cords are thickened and reddened, and their excursive mobility is impaired. Swelling of the mucous glands sometimes occurs, but the secretion is generally scanty. These changes are occasionally limited to one side of the larynx. Thus, one half of the epiglottis, its corresponding aryepiglottic fold and ventricular band, may

be swollen and thickened, while the opposite side of the larynx is in a state of simple congestion. If the throat be neglected, minute ulcers form by the liquefaction of the superficial portions of the mucous membrane, which partake at first more of the nature of erosions, but which, in long-standing cases, involve the whole thickness of the membrane and sometimes reach the cartilage. Arrived at this period or stage of ulceration, the affection becomes stubbornly rebellious to treatment. Under antisyphilitic medication the ulcers heal, it is true, and temporary relief is afforded; but sooner or later fresh ones appear in other parts, thickening and hypertrophy become progressive, and secondary changes may be induced in the lungs, either by direct extension through the trachea and bronchi, or as the result of a diminution in the caliber of the larynx itself. As cicatrization of the ulcers takes place, small papillary or polypoid hyperplasiæ arise around the edges of the cicatrix. When small, they impart (post-mortem) to the finger a rough, granular sensation. They are more common in the child than in the adult, and the same may be said of the ulceration which precedes them.

Such is the common history of this form of laryngitis. Commencing in early childhood as an ordinary catarrh, for which it is often mistaken, it gradually but surely asserts its specific nature. To it is due the characteristic cry and other symptoms referable to the larynx, so common in the early stages of congenital syphilis. The changes which have been described require time for their completion, months and even years elapsing before they reach their full development.

From the fact that hoarseness and other laryngeal symptoms sometimes coexisted with mucous patches on the palate and in the pharynx, it was assumed by Diday (*Syphilis des nouveaux-nés*, *New Syd. Trans.*, pp. 64, 65) that they were due to the presence of similar lesions within the larynx, in the neighborhood of the aryepiglottic folds. Czermak (*Der Kehlkopfspiegel*, *New Syd. Trans.*, 1861, p. 53) and Türek (*Klinik*, etc., *Wien*, 1867, 161te Fall, and *Atlas*, xxii, 4) have each reported cases where they were seen with the laryngoscope; and one is referred to in the *Gazette des Hôpitaux* (*Gaz. des Hôp.*, 1860, No. 51, p. 202), in which they were found in front of the arytenoids. The patches described by Czermak and Türek are, however, evidently examples of true ulceration, and the account of the laryngeal appearances in the child from the *Hôpital Necker* is too meager to be of any value in establishing the existence of mucous patches in the larynx of the congenital syphilitic.

The deep, destructive, ulcerative laryngitis corresponds in physical characters pretty closely to the tertiary inflammation of acquired syphilis. It may follow the superficial form, but generally occurs independently of it. It is sometimes among the first symptoms of infection, and is then most destructive.

As a rule, deep, pharyngeal ulceration precedes or coexists with this form of laryngitis, but deep ulceration of the larynx occurs, too, without the slightest evidence of pre-existing pharyngeal lesions.

Laryngeal ulceration does not commonly follow the pharyngeal destruction of so-called latent syphilis. The palato-pharyngeal ulceration found in tardy congenital syphilis has little tendency to invade the larynx; its future theater of action is the naso-pharynx and nose.

The first stage of this form of laryngitis consists either in a deposit of gummatous material in, or a round cell-infiltration of, the structures which subsequently become the seats of ulceration. The resulting ulcers have the same appearances as those found in the tertiary period of constitutional syphilis, and lead to similar deformity and stenosis. They are single or multiple, symmetrical or confined to one side of the larynx. Their most frequent seat is the epiglottis; they are often situated in the ventricles; less frequently on the upper and under surface of the vocal cords, ventricular bands, aryepiglottic folds, and plica meso-arytenoidea. They are also observed in the subglottic cavity.

There is a remarkable tendency in the laryngeal ulceration of congenital syphilis to destruction of the deeper tissues—the cartilages and their envelopes—and this predisposition is most marked in those in whom the throat is attacked at an early stage of the disease. There seems to be an inherent virulence in the process, which finds in the imperfectly developed laryngeal structures an appropriate field for the display of its destructive power. Chondritis, caries, and necrosis are found in over two thirds of the recorded cases at all ages. Of these, over three fifths occurred within the first year of life.

Chronic interstitial laryngitis is intermediate between the two forms of inflammation already described, and is rarer than either; but it is of considerable practical importance in view of its insidious tendency to stenosis. It consists essentially in a gradual deposit of a fibroid material in the tissues of the larynx which leads inevitably to serious interference with respiration. But few cases of this condition have been recorded; it is possible, however, that it may be looked for at a period when other interstitial changes, notably keratitis, commonly develop.

Lesions of the Trachea and Bronchi.—The trachea is the seat, though much less frequently, of the three forms of syphilitic inflammation described as occurring in the larynx. Apart from superficial changes, well-pronounced tracheitis and deep ulceration are relatively rare. The condition most commonly found is congestion, generally streaked or confined to certain areas, with moderate swelling of the mucous membrane. In two cases examined post mortem there were numerous small ulcers confined to the upper third of the trachea. Small granular hyperplasias existed in their vicinity. Ulceration and cicatrices have also been ob-

served by Hüttenbrunner (Jahrbuch f. Kinderheilkunde, Bd. v, 1872, p. 338), Woronchin (ibid., Bd. viii, 1875, p. 108), and Sturges (*vide* London Lancet, April 10, 1880, p. 566), and a case of stenosis has been recorded by Steiner (Jahrb. f. Kinderheilkunde, Bd. vii, 1865, ii, § 64).

Symptoms of Congenital Laryngeal Syphilis.—*Voice and Cry.*

—The cry in the infant and the voice in the older child exhibit all degrees of phonetic impairment, from slight huskiness to the toneless whisper of absolute aphonia. At first the cry has a shrill, piping tone, that has been compared by West and Zeissl to the sound of a child's toy trumpet. This sometimes degenerates into a peculiar squeak. Soon it assumes a characteristic, vibratory twang, difficult to describe, but not unlike the vocal resonance which is heard just above the level of a pleuritic effusion. This is probably due to the sonorous vibrations of the thickened mucous membrane, which, at a stage when infiltration has not advanced to consolidation, is loose, and admits of being thrown into exaggerated vibration by the current of expired air. Later the voice becomes harsh, cracked, and finally completely lost. It is surprising, however, to what extent the larynx may be involved without impairment of the voice.

Cough is frequently present, and is often a very distressing symptom. It is paroxysmal, suffocative, intermittent, raucous, and frequently followed by vomiting. The impairment of phonetic quality may be of diagnostic value in those cases in which corresponding changes in the voice are absent. The paroxysms may be excited by crying or attempted deglutition, but are generally worse at night, leading to attacks of dyspnoea, which threaten suffocation. There is not much expectoration, except in the deep ulcerative form, when it is very profuse and mucopurulent, filling the larynx and interfering with laryngoscopic examination. The amount of secretion may be taken as an approximate measure of the extent to which the destructive process has advanced.

Respiration is seriously embarrassed, the rhythm hurried, and often interrupted. Attacks of dyspnoea are brought on by coughing and suckling, and are worse at night, leading to orthopnoea, cyanosis, and convulsions. Sometimes the breathing has a *bronchial* sound, and is stridulous and stertorous, according to the amount of obstruction. The respiratory distress is, as a rule, commensurate with the amount of laryngeal stenosis; but secondary changes in the trachea, bronchi, and lungs are sometimes important factors in its production. It is also modified by the degree of nasal obstruction from coryza.

Deglutition is difficult, and sometimes painful and impossible. It is caused by pharyngo-laryngeal swelling and ulceration; but we may assume that in some cases it is due to lesions of the oesophagus itself. Laryngismus occurs quite frequently, and is sometimes the immediate cause of death. In a case reported by Thomas Barlow (Trans. Path. Soc.,

London, vol. xxviii, 1876–1877, p. 287) it was associated with disease of the meninges of the brain.

In many cases no definite relationship seems to exist between the laryngeal and cutaneous lesions of congenital syphilis. It is also an interesting fact that, while the external lesions yield readily to antisymphilitic medication, the laryngeal often have a tendency to persist. The larynx seems to be the last organ to surrender to therapeutic influence. Among the secondary complications in the lungs are congestion, atelectasis, emphysema, bronchitis, pleurisy, and pneumonia. The latter is often the immediate cause of death. But the condition which commands most serious attention is the sudden and fatal laryngeal œdema, which occurs without warning, and from which the patient often dies before assistance can be obtained.

Diagnosis.—The laryngeal affection in its first stage may be mistaken for simple laryngitis, and when associated with chronic bronchial irritation or pulmonary inflammation may be confounded with tubercular laryngitis. But the greatest difficulty will arise in its discrimination from laryngeal growths. Here, if laryngoscopic examination be impossible, the diagnosis may be involved in doubt.

Rapid cicatrization of laryngeal ulceration under the iodide of potassium practically settles the question of syphilis; but the diagnosis can be made, in the majority of instances, without invoking its aid. When ulceration attacks the deeper structures the action of the iodide may be slow. Here, if nutrition be stimulated by tonic treatment, and especially by cod-liver oil, the processes of repair will be accelerated. But this obviously does not warrant the conclusion that the destruction is not syphilitic. The power of cod-liver oil over the phenomena of congenital syphilis is the same as that which it exercises in other wasting diseases—an influence which is often overlooked. The assumption, therefore, that an ulcer which heals under this drug, either alone or combined with the iodide of potassium, is necessarily scrofulous, diverts the mind from a rational interpretation of the case.

Prognosis will be influenced greatly by the age of the patient; the earlier the throat is attacked the more serious the results. Pharyngo-laryngeal ulceration occurring within the first year is almost invariably fatal. Deep ulceration of the larynx, in view of its destructive tendency, offers a grave prognosis at any period. The prognosis in chronic, superficial laryngitis is more favorable as regards life, though the tendency to laryngeal œdema and spasm should not be lost sight of. This form of laryngeal syphilis is exceedingly persistent and intolerant of treatment. It is often the *primum vivens* and the *ultimum moriens* of the disease. As Vidius said of syphilis, “it makes many truces, but never peace.” In all forms of laryngeal syphilis, death may take place from

acute œdema. The prognosis will depend, furthermore, upon the gravity of the general infection and the secondary complication in the lungs.

Treatment.—In acute laryngeal syphilis the treatment should consist in mercurial inunction over the thyroid cartilage, the inhalation of calomel or iodide of zinc in the form of vapor, and the internal administration of potassium iodide. The aggregate daily dose of the latter should be large, and the drug pushed rapidly to the verge of iodism.* Should the dangerous symptoms not yield in forty-eight hours, the question of tracheotomy should be considered.

In the more chronic forms, mercury in tonic doses, combined with iodide of potassium, should be exhibited, the local treatment consisting in the use of topical applications and inhalations. As a topical application to the ulcers, great reliance may be placed upon iodoform, or the vapor of the iodide of zinc may be used.

THE EFFECT OF CERTAIN ACUTE MORBID PROCESSES UPON THE THROAT AFFECTIONS OF SYPHILIS, CONGENITAL AND ACQUIRED.

In a paper read before the American Laryngological Association in 1884 (A Contribution to the Study of Congenital Syphilis, Trans. Am. Laryng. Assoc., 1884, and N. Y. Med. Journ., May 31, 1884), I contributed some observations on the manifestation of congenital syphilis in the throat, and their behavior under the influence of certain acute diseases, from which the following extract is taken.

In the paper on congenital throat syphilis to which reference has already been made in the preceding section (article on Congenital Syphilis of the Larynx), the following conclusions were reached in regard to deep destructive ulceration of the oro-pharyngeal cavities:

1. That deep ulceration may invade the palate, pharynx, and nasopharynx at any period of life from the first week up to the age of puberty. Thus, of thirty cases analyzed with reference to the period of invasion, fourteen occurred within the first year and ten within the first six months of life, the remainder occurring at periods more or less advanced toward puberty.
2. When the eruption of inherited syphilis is apparently delayed until the latter period, that lesions of the palate and pharynx are found with a peculiar constancy, and often first attract attention to the existence of a diathesis of which they are the sole pathological expression.
3. That females are attacked more frequently than males. Thus, out of sixty-nine cases of pharyngeal ulceration, forty-one occurred in the former sex.
4. That ulceration may occur in any situation, but its most frequent seat is the palate, for which it exhibits the

* In using large doses of the iodide the physician should at the same time be on the lookout for the œdema of the larynx not infrequently occurring from its administration.

closest elective affinity. 5. That when situated at the posterior portion of the hard palate the tendency is to involve the soft palate and velum, and thence to invade the naso-pharynx and nose; while, situated anteriorly, it seeks a more direct pathway to the latter, which is established by perforation of the bone. 6. That the next most common seats of ulceration in order of frequency are the fauces, naso-pharynx, posterior pharyngeal wall, nasal fossa and septum, tongue, and gums. 7. That ulceration, especially that of the palate, shows a disposition to centrality of position, together with a special tendency to caries and necrosis of the bone—a fact probably explicable by the great vascularity of the periosteum and medullary membrane in youth. 8. That the tendency to necrosis exists at all periods of life, but especially in early youth, when it is more destructive and less amenable to treatment. 9. That while deep pharyngeal ulceration generally precedes or coexists with similar affections of the larynx, the latter occurs, too, without evidence of pre-existing pharyngeal lesions. 10. That simultaneous or consecutive ulceration of the palate, pharynx, and nose seems to be characteristic of syphilis, or at least occurs more frequently in this than in any other disease.

I bring these facts again into prominence because they differ from commonly accepted views, and because they possess at least a certain value by reason of the method by which they were obtained. I desire also to reiterate what was said in connection with the confusion of these lesions with so-called “scrofulous” ulceration. Without entering into a discussion of the subject, suffice it to say that there is no just ground for belief in an ulcerative scrofulide of the throat. It needs only the most superficial review of the writings of those who maintain its separate existence to show the utter confusion which prevails, as the result of erroneous views handed down among the traditions of an obsolete pathology.

It is obviously a point of great practical importance that this fact should be recognized, and especially in view of the rapidly destructive tendency of inherited syphilitic ulceration in the oro-pharyngeal cavities and larynx.

The throat ulceration of congenital syphilis not only exhibits a special tendency to rapid invasion of the deeper tissues; it often possesses an inherent virulence which places it apparently beyond the reach of therapeutic control. This is markedly true of the ulceration which occurs in the earlier years of life. Cases are now and then encountered in which the ulcers stubbornly refuse to cicatrize, or do so sluggishly and imperfectly, healing at one point and becoming simultaneously active at others. *Under such circumstances, when remedial measures are apparently of little or no avail, they sometimes cicatrize, as if by magic, on the acces-*

sion of an acute disease. It is to this that I wish to direct particular attention.

The clinical study of the cases upon the analysis of which the report referred to was based disclosed certain striking facts in connection with the influence of some of the ordinary infectious diseases of childhood upon the progress of the inherited syphilitic affection. From the historical narrative furnished by this particular group of cases it would appear (1) that, while congenital syphilis affords no absolute protection against certain acute infectious diseases, its existence in the individual seems often, other things being equal, to mitigate their severity and exert a favorable influence on their course; (2) that certain acute diseases, accompanied by an exanthem, favor the dissipation, at least temporarily, of the throat and other manifestations of the disease; (3) that while at no period of the disease is the child exempt from these affections, they are more liable to be contracted during the period of latency—that curious interval of apparent health in congenital syphilis which Cuzenave has poetically called the sleep of the virus. These remarks are limited to scarlet fever, measles, and chicken-pox, but they could doubtless be extended to embrace others of the exanthemata.

They do not apply, for obvious reasons, in the case of excessive virulence of the syphilitic cachexia or malignant epidemic influence of the intercurrent disease.

Of special interest is the effect produced by acute febrile disease upon the throat lesions of congenital syphilis. *Chronic inflammatory conditions and ulceration of the larynx, pharynx, and nasal passages are often influenced in a remarkable manner through the presence in the individual of an intercurrent febrile affection. This is, moreover, eminently true of those acute blood diseases with special tendency to local manifestations in the throat, such as scarlet fever, measles, diphtheria, etc. According to personal experience, scarlet fever and measles exert, as a rule, a favorable influence on the course of the throat affection, their supervention being of itself sufficient to cause its complete disappearance. The poisons of the two diseases in their circulation in these regions appear to be mutually destructive, and the throat escapes by virtue of such reciprocal antagonism.* The cure here may be permanent, or relapses of the inflammatory or ulcerative process may follow the removal of the antagonistic influence of the intercurrent disease.*

These remarks do not apply to diphtheria. When this affection supervenes during the existence of lesions in the throat, the patients rapidly succumb to the disease. The existence of syphilis in the child apparently increases the tendency to membranous formation; indeed, in some in-

* It is quite possible that this may also be true of other mucous surfaces of the body.

stances, apart from the presence of the diphtheritic process, there seems to be a *special tendency to fibrinous formation in the nose and retranasal space*.

The influence of acute disease upon the manifestations of constitutional syphilis is a subject which has received some attention at the hands of syphilographers, especially certain of the French school; but very little is known as yet, beyond the empirical fact that the lesions of that disease, and especially the cutaneous syphilides, are often modified by the introduction into the blood of the virus of an intercurrent febrile affection. This modification may consist either in the permanent or temporary dissipation of existing syphilitic lesions, or in the exaggeration or intensification of the morbid process. Thus, for example, various syphilitic affections, such as skin eruptions, exostoses, etc., have been observed to disappear during the course of erysipelas (*vide* Cazenave and Schedel, *Practical Synopsis of Cutan. Dis.*, etc., p. 353, Phila., 1829; Rayer, *Traité des mal. de la peau*, Paris, 1835; Lamarehe, *De l'Érysipèle salutaire*, Thèse de Paris, 1856, and the excellent articles of Mauriac, *Étude clinique sur l'influence d'érysipèle dans la syphilis*, Paris, 1873; published also in the *Gazette des Hôpitaux*, nouv. sér., 1873, pp. 305, 321, 346, 385, 410, 443, 466, 506, 546, 569, 594, 601; see also Bidentkap's case, cited by Bäumlér, *Von Ziemssen's Cyclopædia*, Am. ed., vol. iii, p. 98, 1875), acute rheumatism (Rayer, *op. cit.*, p. 546, Mauriac; see also Jourjon, *Infl. des mal. aiguës sur quelques manifestations cutan. de la syph.*, Thèse de Paris, 1870), cholera (Cazenave, *Traité des syphilides*, p. 593, Mauriac), variola (Gore, *Lancet*, September 2, 1858), febrile furunculosis (Diday, quoted by Mauriac, *loc. cit.*), etc. Lasèque (*Traité des angines*, pp. 110–112) has recorded a case of ulceration of the pharynx and tonsils which disappeared during an attack of erysipelas; while in a similar one observed by Martellière (*Sur l'angine syphilitique*, cited by Mauriac) a fatal result ensued from that disease. The dissipation of syphilitic eruptions has also occurred during pregnancy (Gilbert, *Bull. de l'Acad. de méd.*, 1851, tom. xvii, p. 156), and as the result of vaccination (*vide* *Revue méd.*, 1861, tom. i, p. 157, Jeltzinski); and there is a case on record in which the latter apparently exerted a curative influence in cases of the pharyngeal vault (Jeltzinski, *loc. cit.*, *Sur la cure radicale de la syphilis par la vaccination*).

The remarkable power of erysipelas over the cutaneous syphilides has suggested its artificial production as a therapeutic agent in these affections (Sabatier, *Propositions sur l'érysipèle considéré principalement comme moyen curatif dans les mal. cutanées*, etc., Thèse de Paris, 1831), while their behavior under the operation of the vaccine virus led to the now almost forgotten practice of Lukonski (Jeltzinski, *loc. cit.*). It has finally even been proposed by an enthusiastic pupil of M. Hardy to inocu-

late the poison of smallpox in cases of syphilis which have resisted all other methods of treatment (Garrigue, De l'influence des mal. aig. sur les diathèses, Thèse de Paris, 1870).

It is sufficiently evident, then, that a reciprocal antagonism exists between the poison of syphilis and that of a number of acute diseases. By what pathological law this is brought about is, in the present state of our knowledge of the mutual relations of disease, a matter of pure speculation.

This remarkable influence of the febrile state upon syphilitic inflammation and ulceration of the nasal passages and throat is also in a measure true of simple inflammatory conditions of these cavities. It were foreign to the purpose of the present article to elaborate this latter and cognate subject, and I shall therefore simply offer for consideration the fact that *simple catarrhal inflammation of these regions occasionally disappears completely, and is permanently cured during the course of an acute febrile disease.* Whether this occurs as a phenomenon of so-called "substitution," or as the result of a profound impression made upon the nutrition of the parts by virtue of which abnormal secretion is arrested and the inflamed tract placed in a condition favorable to resolution, can only be determined by the accumulation of more exact scientific data concerning the reciprocal antagonism of pathological processes.

Without, then, attempting any special explanation or generalization, I present the foregoing observations from my clinical experience as a contribution to the study of an interesting but imperfectly understood subject.

VISCERAL SYPHILIS.

By W. T. COUNCILMAN, M. D.

GENERAL CONSIDERATION OF THE SUBJECT.

Our exact knowledge of lesions of the viscera due to syphilis is of comparatively recent date. The first description of the anatomical changes leading to the production of the lesions is that given by Gubler, of Paris, in 1847, of the lesions in the liver of congenital syphilis. This was soon followed by the description by Dittrich, of Prague, in 1851, of the lesions of the same organ in the acquired disease. The description of congenital syphilis of the lung by Depaul appeared at about the same time. The first careful study of all the lesions of the viscera due to syphilis, with general considerations of their character, drawn from a comparison of the lesions in the various organs, was made by Virchow, and published in the fifteenth volume of his Archives. In spite of the great number of publications on the subject which have appeared since then, comparatively little has been added to the classical description of Virchow.

Nothing has so added to our knowledge of the anatomical processes of disease as the discovery in recent years of their essential causes. In general we know that the character of the various anatomical lesions in the infectious diseases is due to the specific character of the virus of the disease, the manner in which it enters the tissue, and the anatomical structure and general character of the tissue affected. We know that certain tissues have a much greater resistance to the action of a given virus than others, and that in the same tissue varying lesions may be produced depending on whether the virus reaches it by means of the blood or lymphatics, or by means of ducts communicating with the outside. In a number of infectious diseases we are able to distinguish lesions of two sorts: first, those due to the direct local action of the *specific living organisms* of the disease and always found in connection with these organisms; and, secondly, those which are due to the action of a *chemical substance* or *substances* formed either by the living organisms directly or by the tissues of the body under the action of the organisms. The best example of this is given in diphtheria, in which the local lesions due to the direct action of

the bacilli on the tissues are by no means commensurate in importance with the lesions produced by the action of the chemical toxic albumens. We know at present little or nothing concerning the essential cause of syphilis; proof has not been brought forward which would justify us in regarding any of the organisms which have been described in connection with the lesions as causative. It is probable that when the cause of the disease has been discovered a light equal to that thrown on tuberculosis by the discovery of the tubercle bacillus will be shed on the disease. We are justified, however, in extending to syphilis analogies drawn from our knowledge of other infectious diseases.

In syphilis we must distinguish lesions of varied character, the variations depending largely upon the time which elapses between their appearance and the initial lesion of the disease. They have been in this way divided into the primary, the secondary, and the tertiary lesions. In the first place, closely following the initial lesions, we find lesions of the lymph glands in the immediate vicinity, followed by more or less involvement of the lymph glands in distant parts. There then takes place a period of latency, lasting six or seven weeks from the date of the initial lesion, which is followed by lesions of the skin and mucous membranes. It is probable that these lesions are due to the action of a definite *contagium vivum*, which, in the first place, starting from the initial lesions, reaches the lymph glands, and after a variable time enters the circulation, producing lesions in the skin and mucous membranes. From the character of these lesions and their extent we must believe that the infectious agent could only reach the parts affected by means of the blood circulation. At this time lesions of the viscera are but little apparent, but it is probable that they take place. Little opportunity has been given for their study by the rarity with which death takes place in these earlier stages, and up to the present no careful anatomical study of the viscera has been made in the early stages of syphilis. The evidence that they do take place is shown in the albuminuria which often appears during the time of the skin eruptions, and slight jaundice. These lesions are temporary. They subside with the subsidence of the lesions of the skin and mucous membranes, and they probably consist in very slight parenchymatous degenerations. They are probably due to the action of chemical substances which have no specific characters and are produced by the lesions. In the great majority of cases the disease ceases with these secondary lesions. The percentage of cases in which the tertiary lesions, which include the essential syphilitic lesions of the viscera, appear, differs with different authors. Profeta gives their frequency at 5 per cent of the cases, Diday as 10 to 12 per cent, Rollet as 5 per cent, Haslund as 9 to 10 per cent, Manriac as 10 to 15 per cent. This refers to cases which have undergone more or less antisymphilitic treatment. In cases which have not undergone

any treatment Sigmund gives their number as 30 to 40 per cent. These figures, however, derived exclusively from clinical observations, do not give any definite information as to the frequency of late lesions, for they only refer to cases in which the lesions have been sufficiently extensive to give rise to symptoms, and we know that in any disease it is difficult to exclude lesions by the absence of symptoms. Still, it is probable that tertiary and visceral lesions do not necessarily play a part in the disease.

After the secondary lesions there is a period of latency lasting a variable time. Its average duration is from five to seven years, but cases have been known in which as many as fifty years have elapsed between the secondary and the appearance of the tertiary lesions. After this period of quiescence a new set of lesions, which differ in character from the earlier lesions, make their appearance. The most marked difference which distinguishes them from the earlier lesions is that they are not infectious. In the earlier stages the disease may be reproduced by inoculation either with the products of the disease or with the blood. In the late stages, in which the lesions are more marked in the viscera than elsewhere, and in which we have essentially the period of visceral syphilis, neither inoculation with the lesions of the disease nor the blood or secretions of the individual are capable of in any way reproducing the disease.

One quality of syphilis which especially distinguishes it from the great body of infectious diseases is its transmission by inheritance. In the earlier stages of the disease it can be transmitted to the offspring either by the father or the mother. The lesions of the fœtus are always much more extensive when the mother is the source of the disease than when it is derived from the father. If the infection of the mother takes place in the earlier months of pregnancy, the child is usually affected; but if the infection of the mother takes place in the last months of pregnancy, and the child is born before the disease has reached the stage of general infection in the mother, the child is not affected. It is probable that the ovum can be infected at the time of conception by the father without any infection of the mother at the same time, but on this point there is still some doubt. The lesions in congenital syphilis may partake of the character of the lesions of both the early and late periods of the acquired disease. They differ from the acquired in that both sorts of lesions may appear together, or lesions corresponding to the tertiary lesions in acquired syphilis may be the only evidence of the disease. In general we know that the lesions in the congenital disease are infectious, but no attempt has been made to separate the lesions into those which are infections and those which are not. The most common manner in which infection from the fœtus takes place is by nursing, and the lesions of the mucous membranes of the mouth, which correspond to the secondary lesions in acquired syphilis, are the source of infection. No inoculations

have been made from the lesions corresponding to the noninfectious tertiary lesions of acquired syphilis with a view of determining their infectiousness.

Finger was the first to advance the idea that later visceral lesions are due to the action of a chemical substance which he regarded as a ptomaine formed by the living organisms. From our knowledge of the other infectious diseases, and particularly of diphtheria, it would seem probable that it is not a ptomaine, but a toxic albuminous substance. The best proof that it is a chemical substance lies in the fact that the lesions are not infectious, and that similar lesions may be produced in the foetus without any preceeding lesions; the lesions being due in this case to the action of the chemical substance in the blood of the mother on the tissues of the foetus. When both sets of lesions are found in the foetus it is possible that we have to do with an infection of the foetus, *plus* the action of chemical poison in the blood of the mother, or the poison may be produced from the foetus itself. It is difficult to explain the period of latency between the early and the late visceral syphilis. We know that the lesions are of very slow growth, and it is possible that the period of latency is only an apparent one, the lesions going on all the time and gradually becoming of sufficient importance to give rise to symptoms. There are other possibilities. The chemical substance itself may undergo a gradual increase in the blood, and only after a long time reach sufficient amount or acquire sufficient virulence to affect the tissues. Or there may be formed in the blood an antidote which in a certain number of cases inhibits the action of the poison altogether, or in other cases it is gradually overcome. Virchow believes that the causative agent is always present in the body, and its action is only manifested by the creation of places of lowered resistance of the tissues, whether by trauma or in some other way. If this be the case, it is difficult to explain the period of latency, for why should not foci of lowered resistance be formed at any period of the disease?

Syphilis produces lesions in the viscera of two sorts, generally combined with one another. There are diffuse lesions, characterized by diffuse parenchymatous degenerations with formation of connective tissue; and circumscribed lesions, which take the form of gummata. Along with these lesions the vessels are frequently affected. We recognize as the most frequent and in all cases the most serious affection of the vessels, amyloid infiltration. We also have hyaline degeneration and inflammation of the walls of the vessels, leading to disturbances in the circulation. The lesions take place slowly. The connective tissue is of slow formation, and often approaches cicatricial tissue in its density and poverty in cells. Accompanying this there is frequently infiltration with round cells, pointing to a more rapid advance.

The chemical substance may act in producing the lesions in a number of ways. It may act directly on the cells of the tissue, producing degenerations which are followed by connective-tissue growth, or it may produce primary lesions in the vessels followed by degeneration. These are its two most probable actions, but we can not exclude the possibility that it may act directly on the connective tissue, exciting this to hyperplasia.

A most important difference is shown in the chemical reaction of the lesions at the different periods, as shown by the effect of treatment. While mercury may be regarded as a true remedy in the earlier lesions, iodide of potassium is equally efficacious in the later visceral lesions.

I. SYPHILIS OF THE PLACENTA.

Among the visceral lesions produced by syphilis, those of the placenta are of the first importance. The placenta, forming as it does the union between the mother and the child, we should expect that many of the questions relative to the nature of the syphilitic virus would be cleared up by a careful study of the lesions produced in it. The placenta, however, up to the present has not received the careful study which its importance merits, and no study which has been made of the syphilitic lesions in it has had in view the clearing up of the general question of the transference of a disease from the mother to the offspring, but the authors have contented themselves with a bare and generally superficial description of the lesions. In all the diseases which can be studied experimentally, and in which the foetus can acquire the disease from the mother, the specific organism of the disease makes its way into the blood of the foetus by first producing lesions of the placenta. Syphilis would seem to be an exception to the general rule, in that in some cases of inherited syphilis no lesions of the placenta have been made out. It is very probable, if we assume the lesions of the late stages to be due to a chemical substance formed in the body, that such a chemical substance might pass directly from the maternal to the foetal blood without the production of placental lesions. The cases, however, in which the foetus is born with infective lesions would not admit of such an explanation, for in these lesions we have no analogy in other diseases which would justify us in believing that they can be due to any other than a living organism. If the fact, so generally believed in, that syphilis can be transferred to the ovum at the time of conception by a syphilitic father without any infection of the mother at the same time, could be regarded as definitely proved, that would also be without any analogy. We should have to assume in such a case that the spermatozoön could carry to the ovum the living disease germ, and that this should grow in the developing embryo. It is probable that the distinction which has been insisted on by

most authors who have written on the subject, between the lesions of the foetal part of the placenta when the disease comes from the father and the foetus is primarily affected, and the maternal part of the organ when the disease of the foetus is secondary to disease of the mother, will not admit of clear proof. The whole question of placental and congenital syphilis is one in which the most careful and exact study is needed, and there is either a lack of material for its study by pathological anatomists, or they are shy in venturing into a field in which there are so many obstacles to be overcome.

Astruc was the first who called attention to the connection between syphilis and repeated abortions. He sought the cause of the abortion in disease of the foetus, and paid little or no attention to the condition of the placenta in these cases. Murat called attention to the fact that pregnant women who had suffered for a long time from constitutional syphilis were predisposed to disease of the placenta. He described in these cases a thickening of the placenta, and says the tissue is frequently covered with extravasated blood or shows dark patches. Afterward Dubois showed that these hæmorrhages are also seen in cases where there was no syphilis either of parents or of the child, and the death of the foetus, which is due to this hæmorrhage in the parenchyma of the placenta, can be more easily explained by the interference with the placental respiration than by a syphilitic infection. Even in the investigations of D'Outrepoint, who first showed that disease of the placenta not only produced difficulty and danger in birth, but also had a marked influence on the course of the pregnancy, on the life and nutrition of the foetus, and must be regarded as a certain cause of disease and the intra-uterine death of the child, no mention is made of placental syphilis. Simpson, in his well-known article on the death of the foetus in consequence of disease of the placenta, passes over entirely the syphilitic disease of the placenta. Lebert investigated two placentas from mothers with secondary syphilis, and found between the layers of the amnion yellow granulations of tubercular appearance in which were microscopic nodules, similar to tubercles. He did not believe, however, that this should be regarded as a specific alteration of the syphilitic placenta.

As on the literature of syphilis generally, so on this subject also, the investigations of Virchow may be regarded as forming the beginning of our exact knowledge. Virchow was the first who attempted to separate the diseases of the maternal from those of the foetal portion of the membranes; he says that it is questionable whether the foetal portions may be primarily affected. Although there are certain cases of hyperplasia and fatty degeneration of the villi of the chorion in very early abortions, he thinks the changes in the foetal portion of the placenta are most often secondary, and that the essential disturbance lies in the maternal portion.

He describes a peculiar hyperplasia of the decidua marked by polypoid excrescences. Further investigation by other authors showed that this lesion could not be regarded as a specific syphilitic lesion, and was probably due to a simple irritation of the uterine mucosa. He also describes a definite form of endometritis placentaris, which he regards as gummatous. The case in which this was seen came from an abortion during the later months of pregnancy, and from a person suffering from constitutional syphilis. The placenta, which in general was well developed, on the maternal side was surrounded by a somewhat thicker and firmer layer of decidua, in which in several places hard nodules projected in wedge-shaped masses into the tissue of the placental cotyledons. In these nodules he was able to distinguish a whitish fibrous border and capsule, with a softer and more yellow mass in the center. The microscopic investigation of this showed firm connective tissue with large cells, in which here and there were foci of small-celled infiltrations which had in part undergone fatty degeneration. Barendsprung, in his work on hereditary syphilis, pays little attention to the question of placental syphilis.

The work of Oedmansson is of importance, although his investigations have not been confirmed by late authors. He found in five out of seventeen cases in which he examined the placenta of syphilitic women, alterations of the vessels of the umbilical cord. This consisted in an advanced atheromatous process of the wall of the vessels with thickening of the intima. In fully advanced cases the intima consists almost exclusively of a case of calcified plates, which were only lightly connected with the vascular wall. Besides this there was more or less thrombosis of the vessels, as well as pathological alterations of the placenta itself. The placental alterations appeared under the form of a more or less advanced interstitial placentitis, whose beginning was found in the disease of the vessels. In other cases there was a focal sclerosis of the placenta with hyperplasia of the villi. The villi appeared pressed against one another, and both the epithelium and the vessels were granular and degenerated. Oedmansson has the idea that many cases of intra-uterine death of the foetus in syphilis of the parents are due to these changes. Charpentier describes a case in which the placenta of a syphilitic woman who had three times aborted in the eighth month was pale, soft, and fatty degenerated.

There has been scarcely any alteration of the placenta which has not been described as characteristic of syphilis. The classical work of Fränkel on this subject has to a large extent cleared up the confusion, and his work is not only the most important one on the subject, but is one to which further investigations have added little or nothing. Fränkel investigated more than one hundred placentas, coming from both syphilitic and normal mothers. Diagnosis of syphilis of the foetus was made by the changes in the bones, which Wegner had shortly before described. Fränkel was

able to separate, by the differing nature of the lesions, the cases in which the foetus was infected from the father from the cases in which the infection came from the mother. In the first case he found a marked affection of the villi of the chorion. This consisted essentially in a hyperplasia of the cells of the villi with compression, and in some cases complete destruction, of the vessels within. In addition to this there was frequently marked hyperplasia of the epithelium of the villi. In place of the soft, myxomatous tissue surrounding the vessels with its few stellate cells,



FIG. 1.—Syphilis of the placenta. Compression and obliteration of the blood-vessels of the villi of the chorion by the growth of œdematous tissue.

there was a comparatively hard and dense tissue, with large numbers of spindle-cells, and between them a relatively dense connective tissue. The villi were thickened and frequently grown together, and in consequence of this condition the vessels were compressed and obliterated (Fig. 1); the blood-space into which the villi entered become more and more filled up by the thickened mass of villi, and in the highest grade of the affec-

tion entirely obliterated by this mass. The interchange between the maternal and foetal blood is more and more inhibited, and finally totally destroyed. Cells of the stroma and epithelium become filled with fatty granulations, and finally undergo fatty degeneration. If the process extends over the entire placenta the foetus always dies; if only circumscribed foci are formed, the foetus can remain living and relatively sound. In between the foci there is a marked congestion, the vessels are ectatic and filled by blood extravasations, showing various metamorphoses. Frequently along with this general hyperaemia there is also a formation of connective tissue. He has only found once the thickening and atheroma of the intima of the umbilical vessels which were described by Oedmansson. The development of this placental disease appears to take place in the later months of pregnancy and after the affection of the visceral organs of the foetus. The earliest period in which it appeared was the beginning of the sixth month; it was found several times in very slight extent and in circumscribed foci. The vessels in the villi were very little changed, and apparently the degeneration only beginning, while the accompanying syphilitic osteochondritis was in an advanced stage and must have existed for a considerable time.

Although this disease of the placenta must exert a marked deleterious influence on the life and well-being of the foetus, it is so often accompanied by extensive lesions of the foetus that it is difficult to say whether the death and abortion are due to it. The slighter and focal diseases of the placenta are probably of less importance for the life of the foetus.

The macroscopic lesions of the placenta consist in a marked hypertrophy either of the entire organ or confined to certain of the cotyledons. The organ is heavier and firmer than normal, and in one case, in which the mother alone was affected, there was a marked gummatous affection of the placenta, and the child, which was carried to full term, was very atrophic, and showed general induration of the lungs, liver, and spleen. The increase in size of the placenta in this case was marked; the convex surface was covered with fresh blood coagula, and almost overgrown by the thickened and cloudy maternal placenta. The lobulation was destroyed. On the surface around the uterus there were grayish-yellow nodules, which extended into the foetal placenta but did not reach its concave surface. The extension of these nodules into the normal tissue was a radiate one, processes of the connective-tissue and small cell infiltration extending into the normal placental tissue. The nodules consisted of a fibrous whitish-gray periphery and a softer yellowish center.

The microscopic investigation showed the decidua only slightly fatty degenerated, with a hyperplasia of the large decidual cells. The nodules consisted for the most part of dense connective tissue with numerous foci of granulation cells. The denser central mass consisted of a

granular detritus. The villi in the neighborhood of the nodules were more or less compressed; most of them were atrophic, their vessels degenerated, and either fatty or calcified. In several cases in which there was an infection of the mother in the last months of pregnancy there was no affection of the placenta, and the child was healthy.

As a result of his work, Fränkel gives the following conclusions: (a) There is a syphilitic disease of the placenta with characteristic lesions. (b) The placental syphilis is only found with congenital syphilis of the foetus. (c) The seat of the disease is different according to whether the mother is healthy, syphilis being conveyed by the father, or whether the mother also is diseased. In the first case the placenta is affected along with the foetus; the affection consists in the definite growth of cellular granulation tissue, with resulting obliteration and destruction of the vessels of the villi, often complicated by a marked thickening of the epithelium. (d) In the second case, when the mother is syphilitic, there are other possibilities. In the first case the mother is affected in conception along with the foetus; there is then syphilitic disease of the foetal portion of the placenta, often with the involvement of the maternal portion. Or, in case the mother is affected later, then the placenta can either remain normal or become affected, and, when affected, the affection takes the form of gummatous placental endometritis; when the infection of the mother takes place in the seventh month of pregnancy there is usually immunity of both the foetus and the placenta.

II. SYPHILIS OF THE HEART AND BLOOD-VESSELS.

SYPHILIS OF THE PERICARDIUM.

Syphilis of the pericardium is very rare. There have been numerous cases reported of fibrous pericarditis in syphilitic subjects, but the disease is not more common in syphilitics. In syphilitic pericarditis the lesions must be of such a nature that we can recognize their syphilitic character. Orth has described such a case in a syphilitic child, in which gummatous masses were imbedded in the fibrous tissue uniting the two pericardia. Lancereaux has described a similar case. Such a condition is only of interest anatomically. Chiari has reported a case of pericarditis due to the perforation of a syphilitic ulcer of the trachea into the pericardium.

SYPHILIS OF THE HEART.

The same confusion which we have found in the lungs prevails regarding the nature and the frequency of syphilitic lesions of the heart and arteries. The reason of this is obvious: There are not only lesions which are due to the probable local action of the syphilitic virus, but there are other lesions more diffuse in character, which must be regarded

as due to the influence of the syphilitic cachexia, and possibly due to the action of a soluble chemical substance present in the blood: to the first belong the gummatus lesions of syphilis as found in the heart and in the periarterial gummata; to the second, the lesions of fibrous myocarditis, arterial sclerosis, and the endarteritis of the smaller arteries. The confusion arises in reference to the lesions in the second category. While there can be no doubt of the causative influence of syphilis in these arterial affections, still it is only one of many causes all acting in the same way, and the lesions of the large arteries in syphilitics do not differ in any way, either in structure or in their clinical course, from the same lesions produced by other causes. The only way in which we can recognize the causal relation of syphilis to arterio-sclerosis is by the frequency with which we find them associated. The difficulty is further increased by the frequency with which other conditions recognized as in themselves causative are associated with syphilis. These other conditions are the immoderate use of alcohol and excessive muscular exertion. Especially in the negro, in whom arterio-sclerosis seems to be especially common, Bacchus, Vulcan, and Venus are frequently associated together. Fibrous myocarditis, which many authors are inclined to consider as largely due to syphilis, is now regarded as due always to an obliterating endarteritis of the coronary arteries, and this may be due to syphilis or to other causes.

Gummata of the Heart.—The first definite case reported of this is that by Rieord, quoted by Virehow. Rieord found in a man who had had repeated chaneres, and later syphilitic tubercles of the skin, and who died suddenly, the heart hypertrophied, and the endocardium of the right ventricle more than one millimetre thick, of a cloudy-white color, and very firm. In the apex of the left ventricle the endocardium was covered with an adherent thrombus, and beneath this there was a hæmorrhagic infiltration of the entire thickness of the heart, with thickening of the pericardium. In several places in the ventricular wall there were small, circumscribed, hard, nonvascular, yellowish masses; some of these had softened in the center, and seemed similar to the syphilitic tubercles of the skin and subcutaneous tissues. The muscular fibers were not pushed aside by the growth, but had degenerated. Lebert also reports a case in which, in a syphilitic woman, there were two round tumors in the right ventricle just beneath the pulmonary valve. These tumors were elastic, of a pale or reddish-yellow color, and on section found to be infiltrated with a small amount of cloudy fluid. Virehow himself reports a very interesting case. In this the heart was greatly hypertrophied and dilated; there was extensive fibrous myocarditis, and associated with this a formation of small, hard gummata.

The gummata may appear in any part of the heart, but they are most

often found in the interventricular septum. They are often of a considerable size, and may reach that of a pigeon's egg. In congenital syphilis in stillborn children miliary gummata have been described. They are usually in the form of small, hard, yellowish or whitish nodules of somewhat irregular contour, with a definite capsule of transparent connective tissue, from which a less firm and dense connective tissue extends. On microscopic examination the central mass is composed of sclerosed necrotic connective tissue in which there are no vessels. The muscular substance is completely replaced at the seat of disease by the fibrous tissue. The muscular fibers undergo hyaline and fatty degeneration, and finally completely atrophy and disappear. The connective tissue generally contains but few cells. In the more recent gummata the center is not so hard and dry and the encapsulation is not so complete. The surrounding connective tissue is more cellular. In certain cases there may be a more diffuse gummatous inflammation. In one of our cases of lung syphilis death was due to rupture of the chordæ tendineæ. There was acute inflammation of the mitral valve with ulceration and fibrinous exudation. The chordæ were thickened, and of an opaque white color. On microscopic examination almost all the chordæ showed extensive necrotic and hyaline changes with absence of acute inflammation.

All authors describe along with gummatous myocarditis a fibrous form also due to syphilis. All forms of fibrous myocarditis are probably due to disease of the coronary arteries supplying the part of the heart affected. With the diminution or complete cessation of the blood supply by the narrowing or complete closure of the arteries various forms of degeneration are produced in the muscular fibers, and they are replaced by fibrous tissues. Something may be told in these cases from the character of the arterial lesions. In the absence of general arteriosclerosis of the large arteries, and with a well-marked evidence of syphilis in other organs, we may with some certainty ascribe these lesions to syphilis. When associated with gummata there is no doubt as to their etiology. All parts of the heart may be affected, but there are certain places of preference. The papillary muscles and their insertions are the most frequent seat, and after this the interventricular septum. In 326 autopsies at the Johns Hopkins Hospital there have been 21 cases in which syphilitic lesions were found; of these there were six cases of fibrous myocarditis. In 98 cases of acquired syphilis, Chiari has only found one case of gummatous myocarditis.

There have been cases described in which the lesions were limited to the endocardium. It is very difficult to say how many of these should be ascribed to syphilis. Lang describes a syphilitic valvular endocarditis in which papillary, condylomatous, grayish-white nodules are distributed along the edges of the valves. These nodules consist of vascular con-

nective tissue, with numerous round cells and hæmatoidin pigment. They arise from the subendothelial tissue of the heart. The parietal syphilitic endocarditis ordinarily takes the form of fibrous and sclerotic thickening of the endocardium. In some cases the endocardium is converted into a layer of dense, grayish-white, almost cartilaginous connective tissue, which may be several millimetres thick. Thrombi are often deposited on the surface. The chordæ may be the seat of the affection, and they are then thickened and shortened. Lang has collected nine cases from the literature. One of these cases was that of a stillborn child with congenital syphilis. An interesting case is that reported by Baumgarten. In this, that of a man of twenty-eight years old, along with syphilis of the cerebral arteries there was a soft, smooth, round excrescence on the left flap of the mitral valve. Microscopically the nodule represented a simple connective tissue hypertrophy, with numerous spindle and round cells. In places many of these cells had undergone fatty degeneration.

Heart Aneurism.—One of the most serious conditions which may result from these affections of the heart is the heart aneurism. In twenty-seven of the cases of syphilitic myocarditis, mostly of the gummatous form, which Lang has reported, aneurism was found in three. Dandridge has reported an interesting case. In this, a negress about thirty, with clear syphilitic history and anatomical evidence of the disease, there was a saecular projection at the apex of the left ventricle. The wall was very thin, and at the most prominent place there was a small opening leading into the cavity of the left ventricle. The outer wall of the sac was formed by an indurated mass, which was separated from the surrounding myocardium, and on section was composed of a dark-red substance in which there were clear lines. The rest of the sac was so thin that the sound introduced into its cavity seemed just beneath the pericardium. In one of our cases there was an interesting condition. In this, a negress about twenty-four, with syphilitic stricture of rectum and history of syphilis, the heart was greatly hypertrophied and dilated; the valves all normal, but dilated. One half of the ring to which the mitral valves were attached was greatly thickened and fibrous. The half of the posterior segment of the mitral valve, corresponding to the thickened part of the ring, was thickened near its attachment and formed part of the wall of a circumscribed aneurismal dilatation which was seventeen millimetres in diameter. It was situated in the upper margin of the wall of the left ventricle, close to the junction with the left auricle, and abutted against the anterior half of the posterior segment of the mitral leaflet near its attachment to the ring. The aneurismal sac was lined with thickened, opaque endocardium, and was free from thrombi. The entire anterior and left part of the wall of the left ventricle, for a distance of four centimetres below the aortic valves, was the seat of aneurism forma-

tion, which also involved part of the septum. The aneurism was formed by three irregular sacs separated by projecting tubercular ridges. They were completely filled with thrombi, and on scraping these away the wall was found to be composed of white fibrous tissue. In most places where this was present all trace of the muscle had disappeared. In the coronary arteries there was an extensive obliterating endarteritis, and the branch of the artery going to the main aneurismal sac was completely obliterated. The case of Dandridge was an example of an aneurism from softening of a gumma, and our case was due to the dilatation of extensive areas of fibrous myocarditis which resulted from the obliterating endarteritis of the coronary arteries.

Symptoms.—From what has been said of the pathological anatomy it may readily be seen that these lesions can not well be productive of definite symptoms. Fournier, in his work, *La syphilis étudiée particulièrement chez la femme*, has described cardiac disorders coming on in the second stage of syphilis. These consist chiefly of palpitation, præcordial distress, and dyspnœa. These should not be attributed to any specific influence on the heart, but are due rather to the anæmia which is often a principal feature of the cachexia. Rosenfeld has described a peculiar form of asthma which he has observed in ten cases of syphilitic disease of the heart. He thinks that this differs from the ordinary cardiac asthma, and proposed the name *syphilitic asthma* to distinguish it. He considers as characteristic of the affection that the attacks come on at time of complete quiet, especially during sleep and in the evening and early hours of the night. In this he compares it to the nightly pains in the bones. As Rosenfeld himself says, these phenomena are not sufficient of themselves to diagnose syphilitic asthma. Cardiac asthma also appears during perfect repose and at night, while the syphilitic may appear during the day. Lang gives a case which was unfortunately not confirmed by autopsy, in which asthmatic attacks of great severity occurring at night formed a prominent symptom. Aphasia has also been observed in cases of cardiac syphilis, but this most probably should be attributed to syphilis of the cerebral arteries in connection with the cardiac syphilis. Some of the cases of cardiac syphilis do not produce any marked symptoms during life, and the disease is only found accidentally at the autopsy. Many of the cases die suddenly. The lesions of the heart, both the aneurisms and the fibrous myocarditis occurring in connection with disease of the coronary arteries, are such that sudden death must be a common termination. Death was sudden in two thirds of the cases reported by Grenouiller.

SYPHILIS OF THE BLOOD-VESSELS.

The lesions of the blood-vessels which have been referred to syphilis are (1) general diffuse arterio-sclerosis; (2) nodular arterio-sclerosis; (3)

obliterating endarteritis of the small arteries; (4) hyaline degeneration of the arterial wall; (5) amyloid infiltration; (6) gummatous endarteritis and periarteritis; (7) aneurism.

Arterio-Sclerosis.—With regard to the first and second, while there is no doubt that syphilis plays a very important *rôle* in its production, it is difficult in most cases to separate the action of syphilis from other causes acting in the same way and at the same time. The disease is a general one, and is primarily due to a degeneration of the muscular wall of the vessel. The muscular tissue undergoes fatty and in most cases hyaline degeneration. The artery undergoes dilatation at this point, and there takes place a growth of the intima to compensate for the dilatation and reduces the artery to a normal caliber. The new tissue of the intima is prone to undergo degeneration, and from this the atheromatous condition proceeds. In most cases the best examples of the disease are found in muscular, well-nourished individuals between the ages of thirty-five and fifty. At the Johns Hopkins Hospital, in the last three years there have been at autopsy fifty cases of arterio-sclerosis. In most of these death was due to some other cause. During the same time, in twenty-one autopsies some manifestation of syphilis was found at the autopsy. The diagnosis of syphilis was made on the various conditions found, but especially on the condition of the testicles. All cases in which diffuse interstitial orchitis was found, even in the absence of cicatrices on the penis and all internal evidence of the disease, were put down as syphilitic. Of these twenty-one cases, nine were free from arterio-sclerosis in any form.

There is a general inclination to regard aneurism as due in large part to syphilis. This is only true in the relation of syphilis to arterio-sclerosis. We must regard arterio-sclerosis as the most common cause of aneurism. Aneurism is either due to a general dilatation of the artery producing the cylindrical form, or to rupture of the wall of the artery at some point. Thoma has shown that it is most common in the beginning of the arterial disease, when the degeneration of the media is not compensated by the thickening of the intima. It is also at this stage, when the individual is capable of severe and sudden muscular exertions and in other ways suddenly raising the blood pressure, that such injuries of the internal walls are most apt to be produced. So far as we know, there exist no extensive and accurate statistics showing the relations between syphilis and these diseases of the arteries. Our statistics refer to such small numbers of cases that they are of little value. We have had at autopsy in the last three years twelve cases of aneurism, eleven arterial, and one cardiac. In eight out of the eleven cases, arterio-sclerosis, often of only slight degree, was found. In the one case of heart aneurism, and in two of the cases of vascular aneurism, there was syphilis. There was nothing in the condi-

tion of the arteries and in the affection generally, in the cases in which syphilis was found, to distinguish these from the others. Virchow expresses himself very cautiously about the relation between arterial disease and syphilis. He says there is a strong tendency to regard these lesions as syphilitic on account of their similarity to other syphilitic lesions. Peter, in his work, *Maladies du cœur et de la crosse de l'aorte*, compares the lesions to the syphilitic lesions of the skin. The resemblance is only an apparent one, and is not shown by a close microscopical study of the lesions. The so-called therapeutic test, the favorable influence that iodide of potassium frequently exerts on aneurisms, is to some extent responsible for the idea of the etiology of syphilis in its formation. We have elsewhere alluded to the fallacy of this so-called test.

Endarteritis.—There is much more reason to connect disease of the smaller arteries with syphilis. The first article in which an attempt was made to connect a typical vascular lesion with syphilis was by Heubner in his syphilitic endarteritis. According to Heubner, there is a disease of the arteries found in syphilitic individuals which in many respects differs from the ordinary arterio-sclerosis. The affection is due to the action of the specific agent of the disease on the endothelium of the vessels, producing proliferation of the endothelial cells. This endothelial growth undergoes peculiar changes which often lead to the formation of one and in some cases several new coats inside of the old lumen. The infectious agent, which at first only acted on the intima, gradually affects all the outer coats. The nutrient vessels of the artery are also affected, and finally a true inflammation of the adventitia is set up, from which a tissue similar to syphilitic granulation tissue is produced. This granulation tissue, which forms part of the early stage of the process, and is found both without and within the intima and the adventitia, becomes gradually transformed into connective tissue. The process, according to Heubner, differs from arterio-sclerosis in representing a true new formation of tissue, while in arterio-sclerosis there is only hyperplasia. To the naked eye the difference is easily seen, because in arterio-sclerosis the walls of the cerebral arteries are thickened and dilated either over considerable distances or in foci. It never leads to obliteration or narrowing of the caliber, which is the condition ordinarily found in syphilitic endarteritis. These views of Heubner at first found general confirmation. The disease which he had first described in the cerebral arteries was found in the coronary arteries of the heart, in the retinal arteries, in the umbilical arteries of syphilitic fetuses, and in various other places. In 1876, two years after Heubner's description, Friedländer described, under the general name of *arteritis obliterans* an arterial disease which was characterized by no specific anatomical characters which could be referred to syphilis, nor could any etiological relation with syphilis be made out.

The whole question of endarteritis has had new light shed on it by the work of Thoma, particularly by his conception of the compensating endarteritis. He has brought out the general law that the caliber of an artery is always in exact ratio to the sum of the capillaries; and when for any reason a portion of its capillaries are destroyed, the caliber of the artery is narrowed by a growth of the intima and the normal relations restored. There is no doubt that much of the arterial disease which is found in the neighborhood of syphilitic affections should be referred to this compensating endarteritis.

But, apart from this, there is no doubt that syphilis does play a considerable part in the production of endarteritis of the small arteries often limited to a particular part of the body. It is probably more frequently found in the brain arteries than elsewhere. The only respect in which it differs from the ordinary form of arterio-sclerosis of the small arteries is in the extent of the growth of the intima, which often leads to complete obliteration. We find in this, as in the ordinary form of arterio-sclerosis, a primary degeneration of the muscular coat. There is no tendency to atheromatous degeneration of the new tissue of the intima. In a well-marked case of it which we saw in a man of twenty-seven, who had a severe chancre and slight secondary symptoms four years before, all the arteries at the base of the brain were affected, some of them entirely closed. There were large areas of softening of the cortex corresponding to the distribution of the arteries most affected.

Gummatous Periarteritis.—Baumgarten has described an affection of the cerebral arteries which he regards as peculiar to syphilis. This is a gummatous periarteritis. In this there are gummata in the adventitia of the arteries frequently involving the media. At the seat of the gumma there is usually a dilatation and a growth of the intima compensating for this. The gummata may be distinctly circumscribed, or there may be a gummatous formation, with numerous points of necrosis, extending for some distance along the vessels. The affection extends from the arteries to the neighboring meninges. Thomas has lately described a case of this in which there were numerous gummata along the cerebral vessels, along the nerves, and in the substance of the brain. The accompanying drawing is taken from his case (Fig. 2).

Hyaline Degeneration.—In addition to these lesions there is frequently found in the syphilitic lesions a hyaline degeneration of the smallest arteries which frequently extends to the capillaries. The entire arterial wall is converted into a homogeneous refractive material which has the characteristic staining of the hyaline substance. It was particularly marked in the spinal-cord lesions of Thomas's case. We have found this a widespread lesion in syphilis of the lungs and kidneys, and in some cases it seemed sufficient to explain the tissue lesions.

Amyloid Infiltration.—The influence of syphilis in producing amyloid infiltration of the walls of the vessels is well known. Here again we see that syphilis may be one of several causes which produce similar lesions.

Symptoms.—The subject of syphilitic disease of the arteries is too extensive to enable us to lay down any rules by which it may be recog-

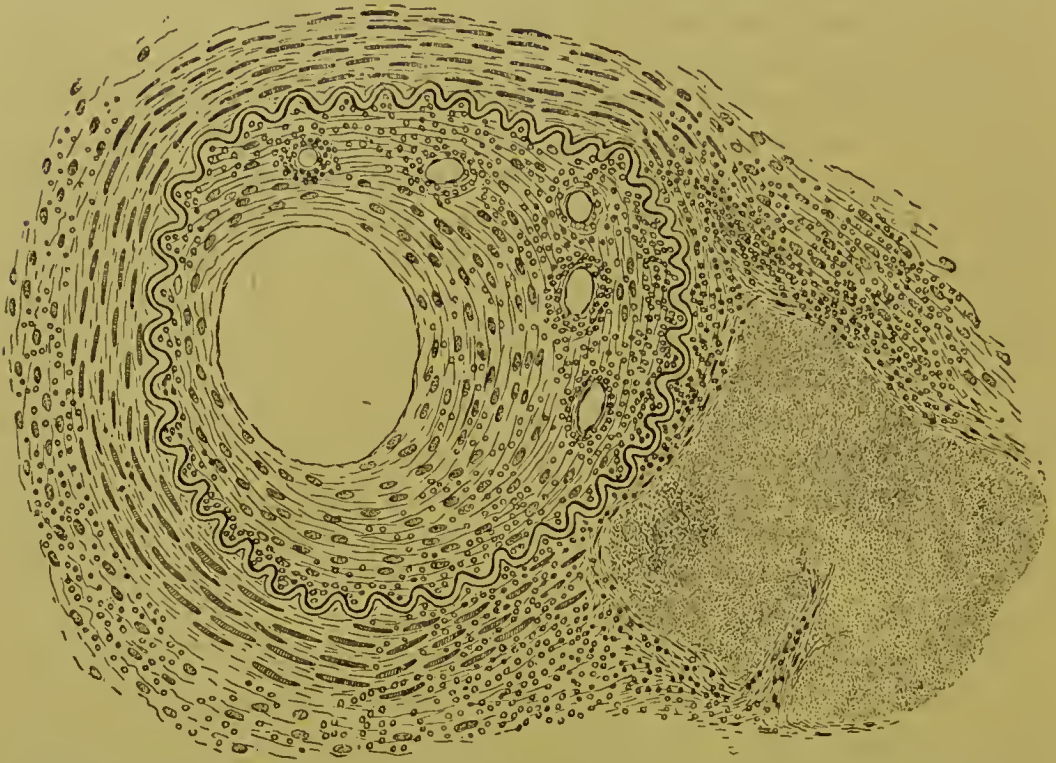


FIG. 2.—Syphilitic endarteritis of a small central artery. The lumen of the artery is greatly narrowed, and a small gumma is formed in the adventitia. The muscles of the media are destroyed at the seat of the gumma.

nized clinically. The symptoms which it produces will, of course, depend upon the locality of the arteries affected and the extent of the lesions. The most important of these symptoms, those having reference to the cerebral arteries, will be considered under Brain Syphilis.

Treatment.—In spite of the difficulty attending the recognition of the syphilitic character of lesions of the arteries, we think, as a general rule, when there are symptoms of arterial disease limited to one part of the body in a subject with constitutional syphilis, antisiphilitic treatment should be instituted. Permanent cure is rarely to be expected. In the earlier stages, when the disease is only beginning, good may be accomplished, but unfortunately the degenerations which are almost certainly beyond repair are already accomplished before the symptoms, which depend upon lesions secondary to the degenerations, make themselves manifest.

III. SYPHILIS OF THE LUNGS.

There are few subjects which have been the ground of more contention than this. On the one hand, a number of authors insist on its great frequency, and others are disposed to deny that syphilis plays any part at all in the pathology of the lungs. One cause of the confusion which arises is from the attempt to find in the lungs syphilitic lesions similar in character to those produced by tuberclosis, and the question of lung syphilis has frequently been lost sight of in the contention about syphilitic phthisis. We believe, from the evidence which is presented by the literature of the subject, and from our own observations, that while syphilitic lesions in the lungs in case of both congenital and acquired syphilis are not extremely rare, these lesions do not take the form of a destruction of lung tissue with cavity formation. From the character of the lesion of the lung and the time of their appearance it seems most probable that they are the products of a virus or pathological influence which acts on the lung, not from the bronchi, but from the blood-vessels.

In the older literature there are many references to syphilis of the lungs. It was generally described under the head of phthisis e lue venerea, and had reference not to any definite pathological condition of the lungs, but to phthisis supposed to be caused by the effects of syphilis on the constitution. The presence of the disease was not proved by anatomical lesions, but by the favorable influence of antisypilitic treatment in cases of supposed phthisis. Brambilla has reported the following case, which is often quoted: In a hospital a phthisical patient occupied the adjoining bed to a syphilitic. The first was extremely ill, and there was little hope of his recovery. Through a mistake of the apothecary, the mercury which was ordered for the syphilitic patient was given to the one with phthisis. He soon recovered his former health and vigor, and left the hospital.

The first anatomical description of the lesions of lung syphilis is given by Depaul in 1851. In that year he read a paper before the Paris Academy of Medicine on A Manifestation of Congenital Syphilis consisting in an Alteration of the Lungs. In the year 1837 he presented to the Anatomical Society the lungs of an infant in which there were lesions almost identical to those described in the paper. By some they were regarded as tuberculosis, by others as analogous to the purulent pneumonia of the old. The description of the disease given by Depaul makes it uncertain whether the lesions should be regarded as syphilitic. According to him, the lesion consists in an inflammation of the lung, giving rise to the formation of thickened pus both in the interior of the lung and beneath the pleura. Starting from this work of Depaul's, there has gradually arisen a recognition of the connection between syphilis and

certain lesions of the lungs. Dittrich first described a slaty induration of the lungs, chiefly about the bronchi in syphilitic cases. Wagner and Virchow described more fully the white pneumonia of newly born children, and showed its connection with syphilis. Most of the pathological anatomists speak very guardedly about lung syphilis, as do most of those clinicians in whose work we recognize a close acquaintance with pathological anatomy. Strümpel says that, in spite of the rather abundant recent literature on this subject, there is no complete description of lung syphilis. Those physicians who are inclined to regard every lung affection in a syphilitic individual as syphilitic in character place much in the category which is not syphilis. He thinks that practically one is justified in instituting syphilitic treatment where severe lung complications arise in a syphilitic individual, but only in rare instances has this been followed by success. In his recent text-book Osler is equally guarded in his treatment of the subject. While he recognizes certain conditions of the lung as due to syphilis, he speaks of the rarity of the affection and the difficulty of its clinical recognition. The therapeutic test he considers by no means conclusive. He has never seen a case of syphilitic phthisis, either anatomically or clinically. In Flint's text-book there is a short description of the disease, and he also speaks of the difficulty of its clinical recognition. Fagge says he has never been able to satisfy himself of the existence of syphilitic disease of the lung simulating phthisis but pathologically distinct from it. Many of the lung lesions referred to syphilis are different from syphilitic lesions in other organs of the body. The fact that antisyphilitic treatment may be found beneficial in a case of phthisis in a syphilitic subject is no proof of the syphilitic character of the lesions, for it is well known that any treatment which benefits the general health may exert a favorable influence on the disease.

We have given these few extracts from the leading text-books on the practice of medicine in order to show how much doubt and uncertainty clinicians have in reference to the disease. When we examine the leading authorities in pathological anatomy, we find almost the same uncertainty.

Virchow expresses himself very guardedly about the disease in adults, and is inclined to be skeptical about most of the cases which have been previously reported. He recognizes certain lesions of the lungs as most probably syphilitic, particularly if they are found along with other manifestations of syphilis. The most marked of these is a fibrous interstitial pneumonia advancing along the bronchi and blood-vessels, and which, by continued contraction, produces marked deformity of the lung. Along with this there is frequently pleurisy, leading to the formation of fibrous nodules beneath the pleura. There is no specific difference, however, by which we can distinguish this condition of the lung from that found in

grinders' asthma. There may also be caseous pneumonia and gummata. He says cavities may form from the softening of the foci of caseous pneumonia, and then comes the question of syphilitic phthisis. The gummata are with difficulty to be distinguished from other caseous foci in the lungs. He also describes another condition essentially different from these, and which he is inclined to regard as syphilitic in character. This is a brown induration of the lungs, which is not the result of heart disease or any circulatory disturbance in the lungs. The color is due to the accumulation of brown pigment in the masses of cells in the alveoli. He considers the essential lesion here an alveolar catarrh. This description of Virchow of lung syphilis in the adult has formed the basis of all subsequent descriptions of the disease. Virchow was the first to describe the white pneumonia of children, and Hecker showed its association with syphilis. This condition of the lung described by Virchow was afterward described by Lorain and Robin under the name of epithelioma of the lung, this name being given it because the alveoli were closely packed with desquamated, fatty epithelial cells.

In his text-book on pathological anatomy, which probably best represents the modern views held on the subject, Orth mainly follows the description of Virchow. After an admirable description of the lesions in the infant, he says that it is much more difficult to say what is syphilitic in the lungs of the adult. The presence of gummata forms our best means for the recognition of the disease; but even these are not easily distinguished from the products of tuberculosis, and the diagnosis can only be made by the absence of tubercle bacilli. He thinks it doubtful if in the adult there is an exudative broncho-pneumonia due to syphilis which can pass into caseation or suppuration. He proposes to drop the term syphilitic phthisis, and to place all syphilitic lesions of the lung under the head of lung syphilis.

The most complete description of syphilis of the lung is found in the monograph of Heller published in 1884. Heller has collected eighty-eight cases from the literature of the subject, in eighty-four of which there were autopsies, and adds two cases of his own. In both of his cases there were other lesions of visceral syphilis, and in the lungs a marked narrowing of the bronchi with extensive formation of connective tissue around them. He says that the changes in the lungs agree in the main with those which we have recognized in other organs as characteristic of syphilis. He denies the existence of syphilitic phthisis, and thinks the cavities described in cases which have been regarded as syphilitic were bronchiectases. In most of these cases we would be more disposed, from the description, to consider them not as syphilitic but as tuberculous. On going over carefully the cases which Heller reports, we think that twenty-eight of the eighty-four should, in our present knowledge of the

subject, be regarded as certainly syphilitic. In many of the cases the description of the lung lesions is that of the typical tuberculous phthisis rather than typical syphilis.

It is remarkable the influence which the general acceptance of Virchow's idea of the nontubercular character of most of the lesions of phthisis had on the ideas of lung syphilis. Tuberculosis being excluded for so many of the cases, the etiological relation between syphilis and the lesions was readily assumed. Most of the cases of syphilitic phthisis reported come in the time of the most general acceptance of the views of Virchow, from the beginning of 1860 to 1875. They then become less frequent with the gradual recognition of tuberculosis as the sole cause of phthisis, and with the means given for the recognition of tuberculosis by the tubercle bacillus.

One of the most remarkable articles on the subject of lung syphilis is that of Pancritius (Berlin, 1881), in which he speaks of syphilitic phthisis as one of the most common diseases—one that decimates the flower of the land. Most of the cases he reports are clinical, and consist of rather vague pulmonary lesions with frequently equally obscure general manifestations of syphilis, which were cured by the use of iodide of potassium. From what can be made from the reports of autopsies which he gives, it would seem that the most of the cases were tuberculous.

The recent article of Satterthwaite affords an example of the confusion of mind which many clinicians have concerning this disease. Some of the lesions which he describes are certainly syphilitic, while others have nothing about them which speaks in favor of syphilis. He divides the lung lesions into five groups: (1) Presence of gummata. These are more prominent in the middle and lower lobes than elsewhere. (2) Appearances which simulate those of miliary tuberculosis, but without tubercular bacilli. (3) Fibroid induration. (4) Softening of the miliary deposits and cavities which may be formed at the apices, as in tubercular phthisis. (5) Associated with these intra-pulmonary changes there is an unusual amount of fibrous pleurisy. The cases which the author gives do not lend much weight to his arguments. Only two out of the six might possibly be regarded as syphilitic.

CONGENITAL SYPHILIS OF THE LUNGS.

Congenital syphilis of the lungs in the infant differs in many ways from the lesions in acquired syphilis. The disease is more frequent in congenital than in acquired syphilis, but even in this it is rare. There are no extensive statistics on the subject. Müller examined eighteen still-born children, the subjects of congenital syphilis, and found the lungs diseased in but one case. In one hundred and forty-four cases of congenital syphilis autopsied by Chiari, syphilis of the lung was found in twenty-

two cases. He divides the cases into four groups, the first embracing the macerated fetuses; the second, those which died from syphilis, having lived from a few minutes up to one week; third, those which died from some other affection, living up to one year; and, fourth, cases of tardy hereditary syphilis. There were twenty-nine in the first group, forty in the second, seventy-one in the third, and four in the fourth. In the first group was one case, in the second seventeen, and in the third four. It is less frequent than syphilis of the liver. Haslund has found but four cases in one hundred and five autopsies on children with congenital syphilis. Forster reports the autopsies of thirty-six children with congenital syphilis, and found that fifteen of these died from the lung lesions. He does not separate the lesions typical of syphilis from the intercurrent broncho-pneumonias. Other authors have called attention to the frequency with which broncho-pneumonia and other affections not characteristic of syphilis are found in the lungs of syphilitic children.

In the newly born the disease appears in two forms, which in many cases seem to pass over into each other. In the one form there is a formation of perfectly characteristic gummata, and in the other a more diffuse pneumonic process. The gummata may appear in all portions of the lungs, but, as in the adult, they seem to be more frequent in the posterior and lower portions. The size varies from that of a pin's head to that of a cherry. The more recently formed represent gray or grayish-red nodules, not sharply separated from the surrounding lung tissues, which shows some consolidation. The older gummata are more sharply circumscribed, white and opaque in color, and frequently have an ill-defined capsule. The opacity of the nodule is due to the fatty degeneration and necrosis which is characteristic of gummata. The central necrotic mass is always softer than in the gumma of the lungs of adults, but is firmer than the tubercular caseation. The gummata are more infrequent than the diffuse syphilitic lesions. Along with the gummata, but sometimes independent of it, there are diffuse inflammatory changes. This is the form of white pneumonia which was first described by Virchow and Weber, and the connection of which with syphilis was just established by Hecker.

Greater or less areas of the lung, whole lobules or even entire lobes, may be affected. The diseased portions are more consistent than normal, free from air even in children which are born living, and of a clean, grayish or whitish color. The first case seen by Virchow was in a medico-legal examination; the lungs were so light in color and so voluminous that it was first thought the child had breathed. Both lungs sank in water. Wagner speaks of the process as diffuse syphiloma. On microscopical examination the alveoli are found filled with large, swollen, fatty epithelial cells, the white color of the lungs being due principally to this and the anæmia. The walls of the alveoli are thickened, and fre-

quently some growth of fibrous tissue extends from the walls into the alveoli. The lining epithelium is swollen and cuboidal. Places are frequently found in which growth of young connective tissue with numerous spindle-cells more or less take the place of the pneumonia. Some of these show the beginning caseation of gummata. Birch Hirschfeld considers that the beginning of the affection, which can frequently be observed in stillborn children of the sixth or seventh month, is lobular and peribronchial. The lung is then filled with numerous very small lobular peribronchial foci, which are not sharply separated from one another. He designates these foci as miliary gummata, and lays especial stress on the fact that the interstitial growth of connective tissue is chiefly localized around the vessels in which the adventitia and intima are especially thickened. That is a peculiarity which is also found in the circumscribed gummata, and must be of considerable importance for the course of the process, since it must produce an anæmia. Although the congenital form of lung syphilis is so much more characteristic than the acquired in some of its forms, especially in that of circumscribed gummata, it presents so much similarity to tuberculosis that mistakes in diagnosis may arise. Virchow and Depaul are inclined to consider all the cases reported as congenital tuberculosis to be syphilitic in character. Of course, in a case of doubt, the absence of tubercular bacilli, or the test of animal inoculation, would be conclusive. Clinically the disease has little or no importance. It is most commonly found in children, who die within a few days or weeks after birth. It seems not to be so commonly found in still-born macerated fœtuses. The children may or may not have symptoms of lung trouble, and there are no means by which we can with any degree of certainty diagnose the condition during life. We have neither clinical nor anatomical evidence to show that the condition is ever recovered from.

ACQUIRED SYPHILIS OF THE LUNGS.

The recognition of lung syphilis in the acquired syphilis of adults is much more difficult. Of course, the condition with which it is most apt to be confounded is tuberculosis, and in congenital disease this difficulty, from the extreme rarity of congenital tuberculosis, does not play much part. Although syphilitic formations do present a certain similarity to those of tuberculosis, they have a more or less characteristic histological picture. The main distinguishing feature is the greater tendency to the formation of fibrous tissue in syphilis. In the lungs the matter offers more difficulty than elsewhere, because tuberculosis here is so complicated with chronic inflammatory processes leading to the formation of fibrous tissues. As a rule, in almost any lesion of the lung supposed to be due to syphilis, an examination for tubercle bacilli, and in many cases inoculation of animals, should precede a certain diagnosis.

From the study of the various authors on the subject, and from our own observations of four cases, we think that the lesions of the lung which should be regarded as syphilitic are as follows:

1. Gummata.—This, of course, is the most characteristic of all syphilitic lesions, and between which and tuberculosis the diagnosis, difficult in any organ, is rendered much more difficult in the lungs. The gumma, as the tubercle, is composed for the most part of granulation tissue. In both, a considerable portion of the mass is made up of exudation. In both there are fatty degeneration and caseation of the cells. There is nothing distinctive in the character of the cells, for in each we find granulation cells, epithelioid and giant cells. Giant cells, though met with, do not play so prominent a rôle in the gumma as in the tubercle. We are also able to make the differential diagnosis between the two by the fate of the cells in each. Though the tendency of the cells in the gumma, as in the tubercle, is toward fatty degeneration and caseation, the process is not so rapid in the gumma, nor so complete. Before necrosis takes place, they for the most part develop into connective tissue, so that in the gumma there is a necrosis of tissue rather than of cells alone. There results a very much firmer, denser, caseous mass than we have in the tubercle. We can not so easily crush the gumma, and it does not separate by tearing. The gumma differ greatly in appearance, depending on their age. When fresh, they have an opaque, grayish or grayish-red color, and are not very sharply separated from the surrounding tissue. The lung around them generally is more or less consolidated. The older gummata have an opaque white color, and are separated from the surrounding lung by a dense zone of pearly, transparent connective tissue. We frequently have an appearance as though the gumma was composed of the union of several areas, transparent lines of connective tissue running through the mass, and which gradually unite with the capsule. We are enabled in another way to make the diagnosis between gumma and the tubercle. The tubercle serves as a focus of infection, and close observation of the tissue in the vicinity of a large tubercle will almost always show a number of small recent miliary tubercles. The gummata may vary greatly in size; the miliary gummata of the lung so frequently described were probably not gummata, but tubercles. Porter has described one case with a plate. The plate represents a perfectly characteristic tuberculous lung, a combination between fibrous phthisis, miliary tubercles, and tuberculous broncho-pneumonia. Gummata were present in three out of four cases of lung syphilis which we have seen, and they varied in size from a cherry seed to a hickory nut. Henop has described one case of lung syphilis in which there were numerous gummata in both lungs, from the size of a nut to that of a goose egg, without any breaking down of tissue.

On histological examination, we find the center of the gumma composed of firm, dense tissue, in which there is considerable unclean detritus. On careful examination, we can recognize in this the remains of the alveolar walls, and on staining with the fibrin stain we may find small masses of this corresponding more or less with the alveoli. The fibrous tissue sur-

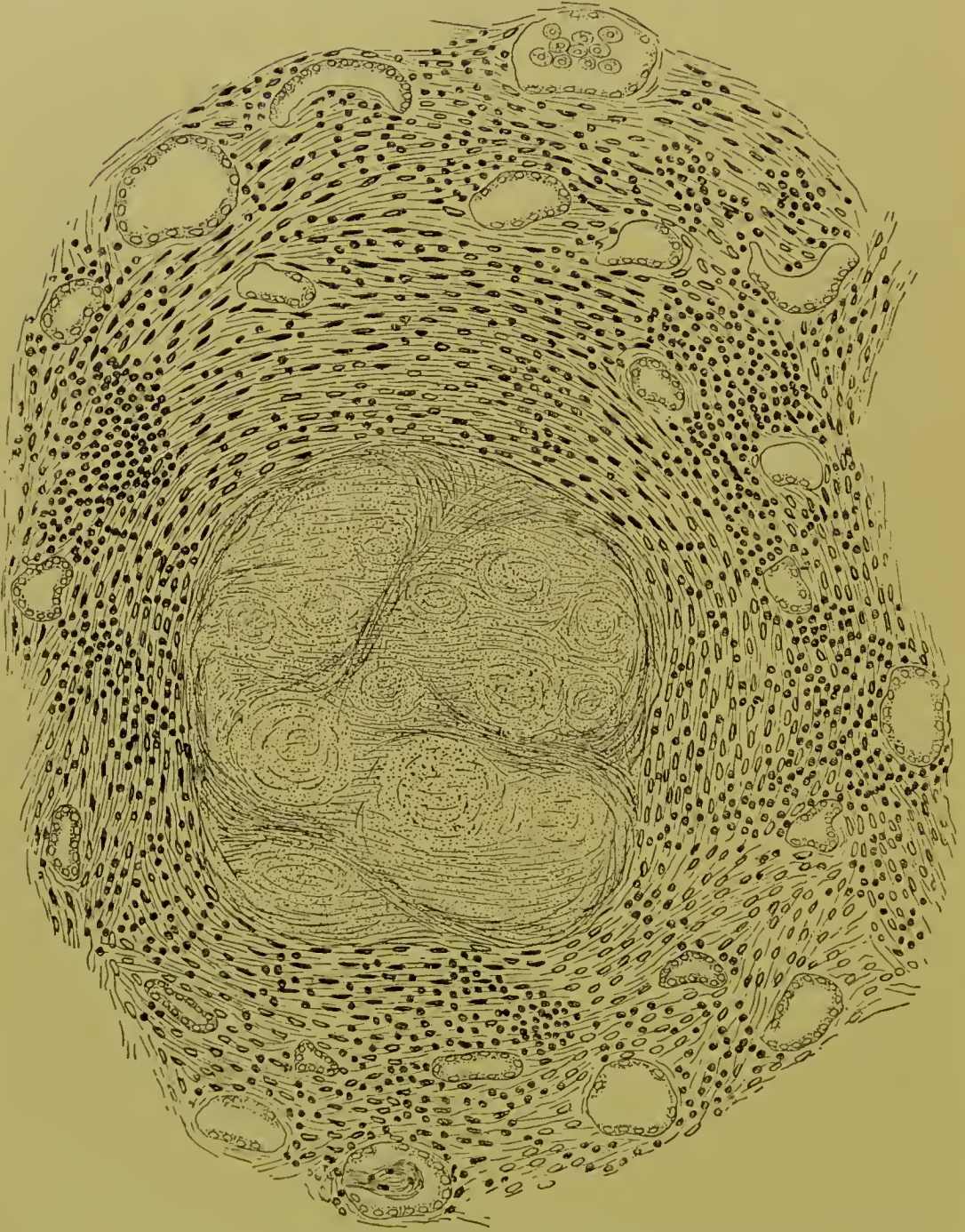


FIG. 3.—Small gumma of the lung. The firm caseous mass is seen in the center. In this the remains of alveoli are more or less distinctly seen. Surrounding this there is a great formation of interstitial tissue. The alveoli of the lung are compressed, and the epithelium has become cuboidal.

rounding it is dense, and poor in cells. There are frequently small projections of this extending from the capsule into the caseation, and in these blood-vessels may often be found. This probably represents an attempt at organization of the caseous material in much the same way that a thrombus is organized. The surrounding connective tissue passes without any sharp line into the surrounding lung (Fig. 3). The gummata are most often situated in the lower or middle and posterior portions of the lung. In one of our cases there was a large gumma in the apex of the left lung. Frequently they are found around the root of the lung, or just below this. In syphilis of the lung, both in the formation of gummata and in the more diffuse processes, the apices of the lungs are generally free; and this is a point of much importance in separating the disease both clinically and anatomically from tuberculosis. The gummata show little or no tendency to break down, and they have not a close connection with the bronchi. In the lobule they appear to be rather in the periphery than in the center.

2. Diffuse Infiltration.—As in congenital syphilis, so we have here, and usually in connection with the gumma, a more diffuse infiltration of the lung. This takes two forms. There is a more acute form, in which the consolidation is for the most part composed of a fibrinous exudation in the alveoli, mixed with large, fatty, desquamated epithelial cells. In the other form which is more closely related to the gumma, there is a general and diffuse formation of connective tissue. Both forms are usually associated together. There are areas of greater or less size of this consolidation. Frequently these areas are close together, or they will coalesce, giving rise to a consolidation of a considerable portion of the lung. In one of our cases almost the entire posterior portion of the lower lobe of the right lung was affected, and in another a large part of the lower portion of the upper lobe of the left lung. The consolidated lung has a reddish-gray, opaque appearance, and the single foci of which it is composed may be made out. On section the cut surface is smooth, the lung is more resistant, and can not be easily torn. On squeezing it a small amount of mucus comes from the cut bronchi. On microscopic examination, the alveoli contain a small amount of fibrin with coarse filaments and fatty epithelial cells. The alveolar epithelium is swollen, and converted into cuboidal cells. The alveolar walls are thickened by the formation of connective tissue, rich in spindle-cells, and this frequently grown into the form of bands. When the portion of the focus most exterior and in which the lesions are most recent is examined, there is frequently found a marked atrophy of the alveolar walls, (Fig. 4.) Where this is most advanced the alveolar wall is changed into a thin, smooth mass of tissue with but few nuclei scattered along it. With this atrophy of the alveolar walls

there is obliteration of the capillaries, which seems due to a hyaline degeneration of their walls. They are converted into rigid tubes, which remain



FIG. 4.—Diffuse interstitial syphilitic pneumonia. The alveoli contain both large, fatty degenerated cells and organized connective tissue. The dense mass of connective tissue represents the boundaries between two of the lobules of the lungs.

open on section, and many of them are so narrow as to scarcely admit a red blood-corpuscle. The hyaline material stains slightly with eosin. It is more refractive than connective tissue, and best seen in sections made

after hardening the tissue in alcohol and straining with picro-carminé. In such specimens it stains a bright yellow color. The large epithelial cells in the alveoli also undergo hyaline degeneration. The cells frequently contain small hyaline masses, and globules of hyaline, evidently resulting from this transformation of the cells, are found in the alveoli. The connective tissue, even when it appears in the form of a thickening of the alveolar walls, does not seem to be formed here, but to grow into the tissue from the neighboring blood-vessels and bronchi. Long processes of it may frequently be traced from the larger blood-vessels for a considerable distance into the atrophied tissue. There occurs in most instances a gradual transition between such a condition of the lung and an almost complete transformation into connective tissue. Its growth becomes more extensive, and the alveoli either disappear entirely or they are converted into small, irregular fissures lined with cuboidal epithelium. The connective tissue is usually loose and succulent, and portions of it may become hyaline. There is a notable absence of acute inflammation, as is shown by the absence of leucocytes in the process. The bronchi usually contain them, and there are some in the neighboring alveoli, but they are generally conspicuous by their absence. In three of our four cases of lung syphilis, this form of pneumonia, which is in many respects very similar to the white pneumonia of infants, and may be regarded as a true syphilitic pneumonia, played a prominent part, and the gummata are usually formed in it.

3. Fibrous Peribronchitis and Periarteritis.—Another lesion of the lung to which attention has been called by most writers on the subject is the fibrous peribronchitis and periarteritis. In this there is a formation of fibrous tissue in the form of dense bands radiating from the root of the lung along the bronchi and blood-vessels toward the pleura (Fig. 5). There is, also, a considerable destruction of lung tissue, not only by the direct substitution of connective tissue for it, but by the subsequent contraction of the connective tissue. The most marked deformity of the lung results from this contraction. There are deep and irregular depressions of the pleura corresponding to the insertion of the bands, and the intervening lung is emphysematous. There are also extensions of connective tissue from the thickened pleura into the lung which are not connected with the peribronchial bands. Gummata may be found in the connective tissue. This form was most prominent in one of our cases. Along with a peribronchial affection there may be an affection of the bronchi. This sometimes represents an extension of syphilis of the trachea into the bronchi. Schintzler has called special attention to this disease of the bronchi, which was found in several of his cases. The bronchi are of irregular caliber, they are stenosed in places, and dilated in others. The mucous membrane is atrophic, the surface dry,

and there are either hard superficial ulcers or extensive stellate cicatrices. The fibrous peribronchitis often seems to be a definite extension of the cicatricial tissue. Virchow gives two typical cases. In one there was a syphilitic cicatrix of the trachea extending into both bronchi, and pro-



FIG. 5.—Syphilis of the lung. The entire lung is dense, and the pleural surface greatly deformed by the contraction of the fibrous bands which pass from the center of the lung to the pleura. The open spaces in the section correspond to the thickened arteries and bronchi.

ducing stenosis. Below the stenosed area the mucous membrane of the bronchi was reddened, and the caliber was dilated. In the lower lobe of one lung there were several larger bronchiectases. Otherwise the lungs were normal. In the other case there were numerous syphilitic cicatrices in the pharynx. In the deep bronchi there were numerous radiate hard

eiatriees with extensive slaty induration of the lung around them. One of the cases which we have seen bears some resemblance to this first case of Virchow's. In this case there was extensive ulceration of the lower part of the trachea, with eiatriees and stenosis. At the bifureation the trachea would only admit a small leadpencil. The lumen of the left bronchus was much narrowed by eiatrieial contraction; that of the right, slightly so. In both lungs the bronchi were dilated and the mucous membrane reddened. Usually there is more or less simple bronchitis associated with the various changes in the lungs. It was present in a marked degree in two of our cases, and to a slight degree in the other two. The smaller bronchi were filled with pus cells, which extended into a few of the surrounding alveoli. It rarely forms any part of the symptoms observed during life, and in our cases was shown to be recent from the acuteness of the suppuration and the absence of all evidences of chronic change.

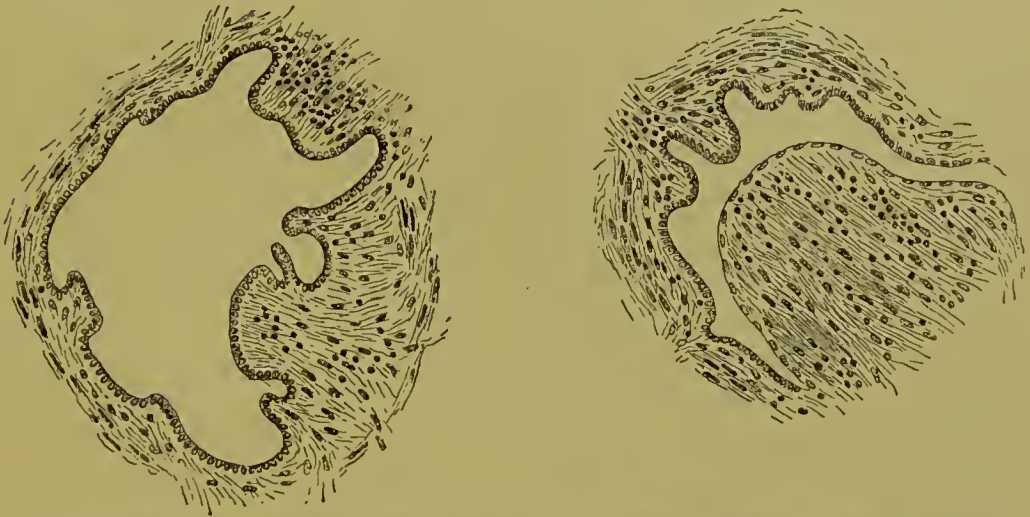


FIG. 6.—Syphilis of the lung. Early changes in the bronchi leading to their obliteration.

It seemed only to have come on in the last days of life. In addition to these changes, the smaller bronchi often undergo an ingrowth of fibrous tissue leading to a narrowing, and in some cases an obliteration, of their lumen. It is the same process as that leading to the obliteration of air cells (Fig. 6). The earliest change found leading to this condition is a small cell infiltration, both around the bronchus and within the muscular coat. The mucous membrane is elevated and the folds accentuated. In more advanced cases there is a dense connective tissue containing comparatively few cells beneath the epithelium. This is not usually symmetrically arranged around the entire lumen, but it projects in large polypoid masses. It is a common lesion in the syphilitic lung, and is of some diagnostic value.

Now, all these lesions may be found in syphilis of the lung. The proof that they are syphilitic is that there is evidence of syphilis elsewhere

in the body; they are not found when there is not evidence of syphilis, and in their general nature they agree with what we know of syphilitic lesions in other parts. Some of them—the gummata, and even the pneumonia—resemble some manifestations of tuberculosis, but this can always be excluded. Their seat and their course are different from tuberculosis. Any one of them may be found alone, but they are generally more or less combined.

4. Ulcerative Lesions.—In all the changes of the lung we have spoken of there has been no reference made to the ulcerative lesions of the lung found in phthisis. Hiller denies that there is a syphilitic phthisis, and thinks that all the cavities in the lung which have been described in lung syphilis are due to bronchiectasis. Virchow and most authors who have devoted much attention to the pathological anatomy of the disease are also disposed to doubt that there is an ulcerative syphilitic phthisis similar to that produced by tuberculosis. It could only arise from the ulcerative destruction of gummata, and these do not show anywhere in the viscera the same tendency to destruction that tubercles do. Not only is the connective tissue which forms their matrix more resistant than the caseous cells of the tubercle, but they do not have the same relation to the bronchi. A close study of the syphilitic lesions of the lung shows that they usually begin not in the center but in the periphery of the lobule. We can not go so far as to deny absolutely the ulcerative destruction of gummata and the formation of small cavities in this way. In one of our cases, in the apex of the right lung, there was a hard, opaque, circumscribed irregular mass, of a yellowish color, measuring four millimetres in its longest diameter, which was broken down at one point so as to form a cavity eight millimetres in diameter communicating freely with a bronchus. The whole mass was surrounded by firm grayish cicatricial tissue radiating in all directions along the bronchi and blood-vessels through the upper third of the lung. Some of the clinical evidence can hardly be denied. There are three cases in the literature in which gummatous masses were at various times expectorated during life, followed by complete recovery under anti-syphilitic treatment. The clearest of these cases, and which leaves little doubt as to the correctness of diagnosis, is the frequently quoted case of Von Cube. Nine years after infection the patient developed symptoms of phthisis, for which he went to the Riviera. There was cough, hoarseness, and emaciation, and much expectoration of fetid secretion. In the secretion some small masses of tissue as large as a pea were found. The expectoration of these masses was preceded by hectic fever, night-sweats, and severe spasmodic cough. At one time twenty grammes of this material were expectorated. Microscopic examination of the masses showed that they were composed of remains of broken down lung tissue, in places almost con-

cealed by development of fibrous tissue. The portion of lung involved was found, in examination, to be just beneath the scapula on the right side. Complete recovery followed the use of mercury. The other cases, which are less definite than that of Von Cube, are reported by Scheek and Guntz. In addition to these, there have been numerous cases reported in which evidences of phthisis with physical signs of cavity formation have developed in the course of syphilis, and have been entirely recovered from under anti-syphilitic treatment. The gummata may soften, break down, and finally disappear in the lung, as in any other part of the body; their place is taken by cicatricial tissue, and there is not the continuous extension of the process which forms so marked a feature in tuberculosis.

Frequency.—Syphilis of the lung in adults must be considered a very rare disease. In 6,000 cases of syphilis in all stages treated in the commune hospital of Copenhagen, it was found only in two cases. In 18 autopsies of adults with acquired syphilis it was found three times. In 97 autopsies on acquired syphilis, Chiari found three cases of syphilitic cicatrices of the lower trachea which extended in the bronchi, and in only one case gummata of the lung. We have found four cases of lung syphilis in 120 autopsies on deaths from all causes. Peterson has collected 88 cases of autopsies in acquired syphilis and found syphilis of the lung in 11 cases. In all statistics of autopsies there is a great deal of difference of the relative frequency of lung syphilis, depending on the varying views as to what constitutes the affection. Statistics as to its frequency, gleaned from purely clinical reports, are utterly valueless.

The disease must be considered one of the late manifestations of syphilis. We have found no cases reported, either clinically or anatomically, where the diagnosis appeared certain, earlier than two years after infection, and from this up to twenty.

The situation of the lesions in the lungs is of great clinical importance. In most cases both lungs are affected, but the disease may be localized in one. The apices of the lungs are generally a point of the greatest importance in the differentiation from tuberculosis. Most frequently the middle and lower lobes are affected, and the posterior portions.

Diagnosis and Symptoms.—From what we have said of the character and distribution of the lesions in lung syphilis, it will readily be seen that there can be no one point which will enable us to certainly diagnose the disease. The clinical diagnosis is most difficult and uncertain, and can only be made by taking a great number of circumstances into consideration. The most important of these is the diagnosis of syphilis from the history of the patient, or its manifestations in some other part of the body. Sacharjin and Pavlinoff lay stress on the absence of a tuberculous family history, and a more robust habit of body than would be found in the same condition of the lung in tuber-

eulosis. Rollet considers that the disease may be diagnosed by the symptoms. The most important of these are the absence of fever, the marked dyspnœa which can even become orthopnœa, a feeling of weight and pressure on the breast, a painful dry cough, and sometimes hæmorrhage. The sputum, at first very spare, later becomes abundant, and similar to tuberculous sputum. On percussion, there is dullness in the middle and posterior portions of the thorax; on auscultation, there may be the same signs as in tuberculosis. The main points in diagnosis given by Schniltzer are the course of the disease, which is much slower than tuberculosis, and the body generally suffers less; the localization of the lesions; fever may be absent, and in any case it is unimportant, sputum less abundant than in tuberculosis; the dyspnœa, which is always much greater than the lesions of the lungs seem to warrant. Fournier divides the disease clinically into three periods: 1. The beginning, which is always insidious, and which does not give rise to any symptoms. 2. When the anatomical changes have acquired a certain development they cause various troubles—(1) slight respiratory difficulty; (2) cough, infrequent, feeble, and often dry. At this time the physical signs are insignificant, or absent if the lesions are seated in the depths of the tissue. When the lesions are superficial, there may be distinguished a diminution or an obscurity of the percussion note over a circumscribed point, and on auscultation feebleness of the respiratory murmur, or a peculiar rudeness of the vesicular murmur. 3. As the lesions extend there is more involvement of the functions of the lung, and the symptoms and physical signs become more accentuated. The dyspnœa increases, but never passes a medium intensity. Cough and expectoration become more abundant. With this the signs of cavities gradually disappear.

Dyspnœa is always a marked symptom of lung syphilis. It is in most cases greater than we can explain by the involvement of the function of the lung by the contraction of the cicatricial tissue. The dyspnœa may be due to a large extent to the interference with function caused by the degeneration of the capillaries. It often rises to actual orthopnœa. It may be more or less continuous, or may be paroxysmal, simulating attacks of asthma. The paroxysmal attacks almost always take place at night. Cough is not very frequent, and generally is hard and dry. The character of it may, of course, be frequently changed by attacks of bronchitis, to which the syphilitic lung seems very liable. The bronchitis may be a permanent feature. The expectoration is slight in amount. The sputum is grayish and transparent, and has not the mucopurulent character of the tuberculous expectoration. The character of the sputum will, of course, be modified by the presence and extent of the bronchitis. A special character may in certain rare cases be given it by the presence of fragments of broken-down gummata. The disease is generally afeb-

rile. There may be some slight attacks of fever due to complications, but in syphilis of the lung pure and simple there is not opportunity given for the absorption of fever-producing substances. Various authors have described hæmoptysis in the disease. It is most probable that the cases in which it was seen were tuberculosis, and not syphilis. If it appears at all in lung syphilis, it is rare and unimportant, or due to some complication. The lesions in lung syphilis are not such as to produce hæmorrhage. The physical signs are those which are due to consolidation of the lung. The lesions are usually in such parts of the lung as are least accessible to investigation.

In most cases the diagnosis will only rest between syphilis and tuberculosis. The most important means of diagnosis is the absence of tubercle bacilli in the sputum; in most cases the absence of cavity formation, and the location of the lesions.

Little need be said about the treatment. In the first place, it should be antisyphilitic; in the second, the removal of complications.

At one time it was held that syphilis exerted a modifying influence on the anatomical character of tuberculous lung lesions. We have never seen any case of tuberculous lesions in a syphilitic in which there seemed to be any influence exerted on the character of the lesions by the tuberculosis.

IV. SYPHILIS OF ŒSOPHAGUS, STOMACH, AND THE INTESTINES.

Although the mouth, pharynx, and the lower part of the rectum are among the parts most frequently attacked by syphilis, syphilitic lesions of the œsophagus, stomach, and small and large intestines, are among the rarest, if not the rarest, of the manifestations of the disease. The frequency with which the mouth and the lower part of the rectum are attacked may possibly be explained by the close connection of these parts with the cutaneous surface and the extensions of the skin lesions to the neighboring mucous membrane. Little as we know about the virus of the disease and the mode of its dissemination, it seems most probable that in the infection of the alimentary tract the virus does not enter from the mucous surface, but is conveyed by the blood-current. We know that in other diseases the alimentary canal possesses a relative protection against the action of a virus disseminated through the blood-current. Thus, in tuberculosis, between which disease and syphilis analogies are so frequently drawn, when the tubercle bacilli enter the lumen of the intestine, either from swallowed sputum or in some other way, and the mucous surface is directly opposed to their action, the various forms of tuberculosis are often met with. In cases, however, of the dissemination of the virus by the blood, as in acute miliary tuberculosis, the alimentary canal

possesses, as compared with other organs, a relative immunity. We may suppose that there is in both diseases some protection afforded, either by the anatomical arrangement of the tissue or the nature of the tissues themselves, to the action of viri carried in the general circulations.

SYPHILIS OF THE ŒSOPHAGUS.

Syphilis of the œsophagus may be dismissed with a word. There are but few cases reported in literature, and most of these are not without doubt. There are cases of extension of syphilis of the pharynx to the upper portion of the œsophagus, and Birch Hirschfeld has reported a case in which, in a man thirty-five years old, with definite lesions of syphilis in the liver and lymph glands, there was a syphilitic ulcer of the lower portion of the œsophagus, which extended into the stomach. This ulcer was the result of a gummatous infiltration of the wall of the œsophagus, and was clearly syphilitic in character.

SYPHILIS OF THE STOMACH.

Syphilis of the stomach, though rare, is much more common than of the œsophagus. Our knowledge of the disease here has been materially advanced by the very comprehensive work of Chiari. Most of the earlier literature on the subject may be neglected. It consists either of descriptions of lesions which might well be referred to other causes, or of clinical descriptions of various forms of gastric affections which were benefited by an antisymphilitic treatment. Not only in this, but in all other forms of visceral syphilis, there should be the greatest skepticism regarding such cases. It may very well be conceived that the functions of the stomach or of any internal organ might be impaired by the presence of the syphilitic cachexia, and when this is set aside by appropriate treatment restoration of function would follow. Cruveilhier was disposed to think that many of the cases of ulcer of the stomach were due to syphilis. More recently Galliard takes the same view, and thinks the reason why syphilis is not more often recognized in the stomach is because the lesions it produces are not sufficiently characteristic. There have been a small number of cases of undoubted syphilitic disease of the stomach reported by Klebs, Cornil and Ranvier, Weichselbaum, and Birch Hirschfeld and Chiari. From these cases we see that almost the only form in which the disease appears is that of gummatous infiltration of the mucosa and submucosa with subsequent ulceration. In the case of Klebs, there was an ulcer on the posterior surface of the stomach near the small curvature. The mucous membrane here was ulcerated in a number of small places, giving the appearance often observed in syphilis of the base of the tongue. Around this the other layers of the wall of the stomach were thickened and of a yellowish caseous character. From the ulcer radi-

ating cicatrices extended into the surrounding thickened tissues. All these cases, with the exception of one case of Birch Hirschfeld's, were in adults. This case was in a newly born infant with skin syphilis and gummata in the liver and lungs. In the pylorus there was a slightly elevated thickened area as large as the palm of the hand. It was of a whitish color and tolerably firm consistency, and was formed by an infiltration of round-cell granulation tissue in the mucosa and submucosa. One of the cases of Chiari's was in a foetus with hereditary syphilis, and the other in a man twenty-three years old, who died of syphilis and tuberculosis. In both, the lesions of the stomach were due to the breaking down of a gummatous infiltration of the submucosa. The great infrequency of the affection is seen in the statistics which Chiari gives. Out of 243 autopsies on syphilitics, of which 145 were cases of hereditary and 98 cases of acquired syphilis, he has only found these two cases in which the stomach was affected. In the cases of congenital syphilis the changes which were found in the stomach, and which could not be recognized as syphilitic from their character, were few, and were chiefly due to circulatory disturbances. In 36 of the 98 cases of acquired syphilis there were lesions found in the stomach. In 14 of the 36 cases the lesions were due to chronic passive congestion from liver syphilis, in 7 to congestion from pulmonary emphysema. The other cases were generally catarrhal, and were due to other causes than syphilis. In one case gummatous ulceration was found. We have no definite knowledge of the symptomatology of syphilis of the stomach. The lesions are not sufficiently characteristic to give rise to any clinical manifestations by which the disease might be recognized. In an extensive syphilis of the liver we may have chronic catarrhal gastritis, due to chronic passive congestion from the impediment to the liver circulation; but the gastritis in this case does not differ from that in chronic passive congestion generally.

SYPHILIS OF THE SMALL AND LARGE INTESTINES.

Syphilis of the small and large intestines, though relatively rare, is yet much more common than syphilis of the stomach. It is more frequent in congenital syphilis than in acquired. In both it takes the form either of circumscribed gummata of the submucosa, with or without ulceration of the overlying mucous membrane, or of diffuse infiltration. Kundrat and Mracek investigated nine cases of congenital intestinal syphilis. The children were either born dead or died a few hours after birth. In eight of the cases the lesions were in the small intestine, in one the large intestine was also affected. They distinguished two forms of the disease. In one form the process is localized in the Peyer's patches or the solitary glands; in the other, areas of the disease are scattered irregularly over the entire intestine. The process begins with a small cell infil-

tration in the neighborhood of the blood-vessels, which leads to a growth of their endothelium. By this, closure of the vessels with a following necrosis and ulceration are produced. They think that the process is always accompanied by a catarrh which produces a thick mucus and leads to thickening of the meconium. The peritonæum in the neighborhood of the ulcers is also frequently affected. It is thickened, and adhesions are formed with adjacent viscera. Baumgarten has published an interesting case in an infant who died of congenital syphilis a few hours after birth. There was a diffuse exudative process in the serosa, leading to the formation of dry fibrinous masses which bound the intestines more or less together. Beginning shortly below the duodenum there was an almost continuous affection of the entire intestinal tract. This took the shape, for the most part, of circumscribed thickenings, which were either visible, or they could be felt on passing the finger along the bowel. No connection could be made out between these formations and the lymphatic tissue. He did not find the participation of the small arteries in the process which Kundrat and Mracek had described. There was a generally diffuse gummatous formation in the submucosa. Miliary and submiliary nodules were found, but they were subordinate to the diffuse process. Only a single ulcer was found in the ileum near the valve. The ulcer was two and a half centimetres in diameter, and had an irregular, dirty base. Examined from the outside the entire intestine revealed a remarkable hardness and stiffness. The histological examination showed in the entire intestine the structure which Wagner has described in the syphiloma. There were neither giant cells nor epithelioid cells similar to those of the tubercle. Chiari has found seven cases of intestinal syphilis in one hundred and forty-four autopsies on congenital syphilis. In two of these cases the large intestine was affected, once in connection with the small intestine, and once alone.

The disease is extremely rare in acquired syphilis. Chiari did not find a single case in his ninety-eight autopsies. Of the cases reported in the literature of the subject, most of them, from the description, are clearly due to other causes than syphilis. Birch Hirschfeld has reported one case of gummatous infiltration of the wall of the small intestine. The writer has seen one case in which, in a woman of forty, with a stricture of the rectum and other evidences of syphilis, there were numerous ulcers of the small intestine. No cause could be assigned for the ulcers. The result of the histological examination, the absence of gummata or extensive small cell infiltration around the vessels, did not warrant us in placing these in any relation with syphilis. There was no amyloid degeneration. Apart from its extreme rarity syphilis of the intestines does not possess any clinical interest. The lesions are not sufficiently characteristic to enable us to recognize it.

V. SYPHILIS OF THE LIVER.

There is much difference between the lesions in congenital syphilis of the liver and those of the acquired form. We will first take up the lesions of the liver in the congenital form of the disease.

CONGENITAL SYPHILIS OF THE LIVER.

The specific syphilitic affections of the liver have been the longest and most clearly known of any of the visceral lesions in congenital syphilis. These lesions appear in a threefold character; they are either diffuse, or in the shape of miliary and larger nodules. These larger nodules are analogous to the gummatous affections of the liver in the acquired form. Gubler was the first to describe the diffuse form. According to him, the disease can be general, or a partial one. In the first case the liver is always hypertrophied, of a flinty color, hard and inelastic; the normal markings of the lobules disappear. On section, it sometimes creaks like cartilage, it is anæmic, and its cut surface has a smooth, homogeneous appearance. When the affection is early, or a partial one, the changes are less marked, the hypertrophy is not so great, and only single portions of the organ have the hard feeling and the flinty color. Even these local changes are usually less marked than in the general form, and on section a yellow serous fluid can be expressed from the organ. The capillaries and all blood-vessels in the diseased parts are obliterated; no fluid can be forced through them by injection. On the surface corresponding to the places most affected there is a fibrinous exudation, and slight, newly formed connective-tissue membranes, which can be easily removed and under which the surface appears rough. The liver is more or less mottled, the color varying between yellow and brownish red, and its tissue is rather transparent. In the diseased places there frequently appear whitish spots of about the size and appearance of a grain of starch, which represents the remains of the normal tissue.

Howitz described this form of disease in an almost similar manner; Virchow designated it as a general hypertrophy, with induration; Wagner described it as a diffuse syphiloma of the liver. According to Wagner, on microscopic examination the interlobular connective tissue is increased in amount, and partly shows a simple hyperplasia and partly is filled with small cells and nuclei. In the interior of the acini there are groups of similar cells and nuclei generally arranged in rows corresponding to the capillaries, and sometimes apparently taking the place of the liver-cells, both nuclei and cells lying within a thin connective tissue. The liver-cells are sometimes normal, sometimes flattened, and sometimes they show the various stages of molecular destruction.

Baraensprung gives the most attention to a new formation which

leads to the formation of nodules, and describes a formation of nuclei and small cells which lie partly between the elements of the liver parenchyma and partly in the walls of the bile-ducts. The liver-cells are pressed apart by this and are entirely destroyed. The walls of the bile-ducts are hypertrophied, the ducts themselves and the blood-vessels are embraced in the new formation, which passes directly into the connective tissue in the parenchyma of the liver. It appears partly in the form of larger nodules and partly as miliary granules. The larger nodules are first of a yellowish-gray or light yellow color, and show a great inclination to become changed into cicatricial connective tissue. In some cases they appear to undergo a purulent metamorphosis or to break down into detritus.

Shüppel showed that in many cases of congenital liver syphilis there was an inflammatory process of the portal vein shown by an enormous growth and cellular inflammation of the connective tissue accompanying it. In the investigation of such livers hard nodules and cords can be felt, which on section are seen to occupy the portal spaces.

The main stem of the portal vein, and sometimes the common bile-ducts, are thickened. The lumen is often so narrow that only a bristle can pass through it. The center of the nodule is caseous. Other authors described a form of liver syphilis in the shape of large nodules. Testalin has described a case in which the liver was of normal size, and in its substance several nodules could be felt, which on section represented irregular rounded tumors from the size of a hazelnut to that of a walnut. These tumors were of a grayish color, hard, elastic, and could be compared to the gummata of the acquired syphilis. Baumgarten and Gaille have described more particularly the miliary nodules. In this the liver is filled with small nodules, which are composed almost entirely of round granulation cells, and which extend into the surrounding liver parenchyma. The changes first described by Gubler are found especially in children who are born dead or who die a short time after birth. In these, the liver is increased in size and is of almost a stony hardness. Scattered through its substance there are small, rather transparent granules, which he describes as similar to small starch grains, and which he supposes represent the remains of normal liver tissue. Hutinel and Hudelo have made careful examination of the liver in a large number of cases in congenital syphilis, and they describe a variety of lesions which represent various stages of one and the same process. The lesions are not always striking to the naked eye. The size, consistency, and color of the organ may present no abnormality when there are perfectly characteristic histological lesions. It is only when the lesions are severe and far advanced that the liver has a special appearance. In general, in all cases there is some augmentation in the size of the liver, but this is not so marked as in the spleen. In the lighter cases, with but slight increase in size, the color is

darker, and it is firmer than normal: it has simply the appearance of a congested liver. If this turgescence of the organ increases, it becomes large, firm, and of a violet color, and on the surface there are small points or depressions. In advanced cases the weight is still more increased, and instead of being one twenty-fifth it reaches one twentieth or even one twelfth of the body weight. There is a general tendency to a rounded form, the capsule appears to be distended, and the edges are rounded as in a fatty liver. The color of the gland differs from the normal; it is yellowish, and Gubler says approaches the color of some of the flints. The surface is smooth, and free from depressions or elevations. The consistency is increased, it is more elastic, it cannot be easily indented or torn with the fingers, and in some marked cases it creaks under the knife like scirrhus. In a great number of cases all the preceding characters are met with, but in a very attenuated degree. The organ is then not so large, and it may have almost the normal volume. The yellowish tint is only marked on the upper surface, especially in the left lobe. The consistency and elasticity are increased, but in less marked proportions. On sections the small, clear nodules may still be seen, but their recognition is more difficult.

In some cases the entire organ is not affected, but the flinty hardness and yellowish coloration appear only in small areas, more or less clearly separated from the normal parenchyma. When these areas are near the surface there are frequently slight depressions over them, and they are generally most marked about the suspensory ligament. In rare cases a true cirrhosis, with a greenish coloration and a granular surface analogous to that of common cirrhosis, has been observed. The gummatous tumors of the liver are much rarer, but we very frequently find, especially in the large flinty livers, small nodules, which Gubler has compared to bran, and which Wagner regards as embryonic gummata. They are frequently more easily seen after the tissue has been for a short time in alcohol. In some cases, in place of these miliary gummata we find larger nodules, of the size of a pea. They may be on the surface or in the parenchyma; they project slightly, have a rounded form, and can not be enucleated. The great vascular trunks are generally free from alteration. Schuppel has described, under the name of syphilitic periphlebitis, a thickening and an almost complete obliteration of the trunk and the large branches of the portal vein.

On microscopic examination the lesions can, in general, be divided into two classes, the diffuse and the nodular. The nodular form never appears alone, but in connection with it there are always diffuse lesions. The increase in size of the liver is due in great part to congestion. This may reach a very high degree, especially in the large, purplish livers, and in all the blood contents is greater than normal. Lucea thinks that

there is an increase in the blood-forming power in such livers. The increased consistency of the organ is due to a general diffuse increase in the connective tissue. This is always most marked about the portal veins, and from here extends into the lobule. In general this takes rather the form of small cell infiltration. The liver-cells are obscured, and in places may be altogether displaced by this. The walls of the capillaries are thickened and the vessels themselves dilated. The liver-cells are atrophic, and in the most marked cases reduced to a small granular mass. The small granules described by Gubler are due to the presence of this granulation tissue in small circumscribed areas. The transition from such areas to the true gummata is a slight one. They always represent a later stage of the same process. The characteristic cloudiness or opacity is due to fatty degeneration and caseation of the nodule. In some cases several of the small nodules may unite in the formation of the gumma, and in this case they generally resemble the conglomerate tubercles. These lesions of the liver are the most frequent manifestations of congenital syphilis. Their frequency is probably due to the position of the liver in the foetal circulation, where it first receives the contaminated blood from the mother. They probably form the most frequent cause of the death of the foetus. In many cases there is no doubt that we may find lesions of the other viscera accompanying the liver alterations, but we may find the most advanced alterations of the liver without any or but slight alterations of the other viscera. Chiari examined one hundred and forty-four cases of congenital syphilis. He divides these into four classes, of which the first embraces the macerated foetuses; the second, those who die within the first week, and in whom death was directly due to the syphilitic lesions; the third, those in whom syphilitic lesions were found, but whose death was due to other intercurrent affections; the fourth, the cases of relatively late hereditary syphilis. In the first group, embracing twenty-nine cases, in twenty-four there was diffuse syphilitic interstitial hepatitis with enlargement and increased firmness of the liver, and in two a gummatous hepatitis. In the second group, embracing forty cases, in thirty seven the diffuse lesions were found, and in two gummata. The third group embraced seventy-one cases; of these there was diffuse interstitial hepatitis in fifty-one cases, and in three gummata. In the fourth group, the subjects dying at the ages of three, fourteen, fifteen, and eighteen years, in all the cases the coarse lobular liver was found. Of the one hundred and forty-four cases, the liver was affected in one hundred and twenty-three, or nearly nine tenths of all cases.

ACQUIRED SYPHILIS OF THE LIVER.

Lesions of the liver are much more rare in the acquired than in congenital syphilis. The anatomical character of the changes differs in dif-

ferent cases. Unlike the congenital syphilis, the gummatus form is most commonly met with. Virchow has made three forms—the gummatus, the fibrous interstitial, and the fibrous perihepatitis. They are frequently combined. The most recent gummata are composed of soft, reddish-gray vascular connective tissue, which is rich in young spindle-cells. When near the surface they may project, and there is little or no contraction of the tissue around them. After a time irregular yellow homogeneous dense masses appear in the centers of these. At the same time the connective tissue in the periphery loses its soft, vascular character, and becomes changed into dense, transparent cicatricial tissue. It rarely appears as a smooth investment of the yellowish central masses, but bands radiate out from it in all directions into the surrounding tissue. On section through the nodule these radiating masses of tissue are very prominent; they represent depressions, between which the masses of liver project. This is often especially apparent after immersion for a short time in alcohol. The yellowish centers represent necrotic places in which the cells and tissue have undergone coagulation necrosis. This has some similarity to the caseation of tuberculosis, but it may always be distinguished from this by its greater consistency. The difference is due to the greater admixture of connective tissue in the gumma, the caseous mass of the tubercle being composed of cells alone, while in the gumma much of the granulation tissue is converted into connective tissue before caseation takes place. The connective tissue around the caseous mass contains relatively few vessels, and in the center the vessels, as in the tubercle, are completely obliterated. The necrosis is doubtless partly due to the anæmia resulting from vascular obliteration, but it is probably due also to the necrotic action of the syphilitic virus on the tissue. After the nodule has undergone this change, further changes do not seem to take place. Softening is extremely rare, and probably most of the cases which have been reported of extensive softening of liver gummata have been due to a mistaken diagnosis. Zenker has reported a case in which numerous gummata were found in the liver of a man forty-one years old, with other manifestations of syphilis. With the exception of two, whose contents were soft and pultaceous, they had a hard, dry character, and in some a concentric lamination was plainly visible. Weber has reported a case of extensive soft gummata in the liver along with extensive syphilitic lesions in the dura mater and the lungs, but the whole account of this case, which is frequently referred to, makes it much more probable that it was not a case of syphilis, but of some malignant tumor, probably sarcoma. Maxon has reported a case in which portions of the tumors in the liver had the consistency of brain, and perforation into the hepatic duct had taken place.

Calcification of the caseous, necrotic tissue is also rare. It is possible

that in some cases the necrotic material may soften, break down, and be absorbed, dense masses of connective tissue taking its place. A part of the changes in the coarsely lobular syphilitic liver may possibly be referred to healed gummata, but the general character of the tumor—its density and nonvascularity, and its being surrounded by dense cicatricial tissue, which also contains but few vessels—is not favorable for resorption.

The number of the gummata is variable; as many as fifty of various sizes have been found in a single liver. Their situation is different. They are sometimes found in or close beneath the capsule, or in the depths of the tissue. Virchow has shown that a favorite seat for them is in the neighborhood of the suspensory ligament, and thinks that slight traumas, which are due to the weight of the organ pulling on the ligament, might account for their presence here. In some cases the formation of gummata here is so extensive that the organ may be almost divided by them. Where they are near the surface there is always considerable retraction of the capsule, making deep, irregular depressions. The capsule is frequently thickened, and there are firm fibrous adhesions between the liver, the diaphragm, and other organs. These adhesions seem frequently to be the continuation of dense fibrous masses in the organ, and the gummata are often found inclosed in these (Fig. 7).

The formation of fibrous tissue is rarely limited to the neighborhood of the gummata, and there may be a general fibrous tissue formation without the presence of gummata. The liver in such cases may offer some similarity to the ordinary cirrhosis, but can be distinguished from this by the greater size and thickness of the bands of connective tissue. These extend down from the thickened capsule and intersect the organ in all directions, producing by their contraction deep depressions which divide the surface into large, irregular elevated areas. From these larger bands smaller ones which still further divide the organ are given off. Probably a more frequent change than either of these, and which may occur alone or in company both with the formation of gummata or the more diffuse interstitial changes, is the amyloid degeneration. The use of the aniline colors, rendering the detection of slight amyloid changes so much easier, has shown how frequent this change is. It is found in almost every case of gummata, and in most of the cases of diffuse lesions. In its slighter grades it affects only the walls of the arteries, but in more advanced cases it is found around the walls of all the vessels, and the entire organ may be enlarged and converted into the dense, well-known, rubberlike consistency. When the amyloid degeneration is the only or most prominent change, the organ is enlarged. Amyloid degeneration, so common in acquired syphilis, is comparatively rare in the congenital variety. In the liver syphilis of the adult the porta of the liver and the

region of the great vessels is generally not affected, but in the congenital form lesions are frequently found here.

Syphilis of the liver is of special interest in the literature of the disease, because with this the study of visceral syphilis began. Gummatous



FIG. 7.—Syphilis of the liver. A central gumma with bands of connective tissue radiating from it and extending into the liver tissue. In the capsule of the gumma there are numerous newly formed bile-ducts.

tumors of internal organs have been known for a long time, but their exact nature was not understood, and they were regarded as steatomata. The first distinct appreciation of them dates from the investigations of Dittrich (1849) on the syphilitic affections of the liver. This careful

observer found, in many cases of constitutional syphilis, hard, yellow, dry, solid, more or less rounded tumors in the liver. They had been observed before, but another character was assigned to them. Budd had described them as belonging to an especial category of tumors, and regarded them as due to the accumulation of caseous material in dilated bile-ducts. Oppolzer and Bochdalek described them as healed cancers. Dittrich showed their syphilitic character, and his investigations formed the basis of further study which led to important advances in our knowledge of constitutional syphilis. Dittrich, however, was greatly in error in his conception of the nature of the local process. He regarded the gummata not as tumors, and even not as new formations, but as encapsulated, unorganized exudations. He thought that in syphilis exudations could be formed which could remain in the form of dry, firm masses. The true conception of the nature of the liver gummata and of most of the lesions of constitutional syphilis dates from the classical investigations of Virchow on the whole subject.

Diagnosis and Symptoms.—The recognition of syphilis of the liver during life is attended with great difficulty. The symptoms on the part of the liver are often concealed or entirely thrown into the background by other and more manifest alterations in other organs. In a cachectic child which is covered with skin eruptions and mucous papules, the few signs that come from the liver may easily escape alteration. In such a child the examination of the abdomen should not be neglected. The most manifest symptoms in hereditary syphilis are those which depend upon the obstruction to the circulation. Lancereaux has called attention to the frequency with which hæmorrhages take place in such a condition, and says that the only evidence of syphilis may be hæmorrhage from the umbilical vessels. Bleeding from the mouth or intestines, even hæmaturia and purpura, may also be seen. Examination of the abdominal organs will show enlargement of the liver and spleen, the liver sometimes reaching to the umbilicus. The abdomen is often tympanitic. There may be very slight ascites, or it may be absent altogether; neither in the congenital nor the acquired syphilis of the liver is it a prominent symptom. Sometimes there is a collection of fluid in the iliac fossa that depends upon the peritonitis which often accompanies the liver changes. The presence of enlarged abdominal veins is not a certain sign, for they are often found in other abdominal troubles in children. During the development of the disease icterus is rare, but it is possible that many of the cases of fatal icterus of the newborn are due to liver syphilis. The course of the disease in congenital syphilis is much more rapid than in the adult. Lancereaux distinguishes two periods. In the first the disease is latent, it does not give rise to any symptoms, and is only discovered at the autopsy. In many cases recovery takes place without the affection

having been diagnosticated during life, and evidences of the healed lesions are afterward found at autopsies. In the other stage the lesions are more marked, hæmorrhages take place, there is frequently some ascites, and the enlarged liver can be felt. The marasmus advances rapidly, and the other syphilitic troubles hasten the end.

The symptoms are even more indefinite in the acquired form. They are frequently so unimportant that the disease may easily be overlooked. Frerichs regards pain in the liver region as one of the most constant symptoms. This may be local, or it may extend over the entire organ. In most cases it is dull and heavy, but it may be active enough to be very oppressive. It is usually made worse by active motion. It often lasts a long time. In one of Frerichs's cases it continued without intermission for three months; in another there were intermissions lasting a week or more, with exacerbations accompanied by a slight fever. The pain is most probably always due to involvement of the capsule of the liver in the process, or to the dragging of the organs on the adhesions with the diaphragm. A second symptom is icterus. This is much more rare, and may be but slight and last a short time. Frerichs found that in one case it was due to syphilitic perihepatitis, and passed away with the subsidence of the inflammation. It was present in another case with amyloid degeneration and gummata. The autopsy showed the jaundice to be due to the pressure of enlarged glands in the porta hepatis. In a third case the jaundice was due to the obliteration of a large bile-duct by a cicatrix proceeding from the concave surface of the liver. The liver was greatly enlarged, and covered on the surface with round, painful elevations, so that at first the affection was held to be carcinoma. No pathological changes have as yet been found to account for the icterus which occurs in the secondary period of syphilis—usually in the eruption stage. Gubler was the first who attempted to prove that this form of icterus was not an accidental complication, but a characteristic symptom of syphilis, and he asserts that it appears either with the first syphilitic eruption or with the later relapses. As a rule, it is not very marked, nor does it continue any great length of time, so that we can scarcely attribute it to a compression of the gall-duct from a syphilitic cell-growth. It is more rational to look upon it, with Gubler, as a congestion icterus due to hyperæmia of the liver; or it may be regarded as a simple catarrhal jaundice, which develops under the influence of fever in the same way as the catarrh of the stomach which is sometimes present. Lancereaux alludes to the possibility of its being due to a swelling of the lymphatic glands in the transverse fissure of the liver. However, icterus at this period of syphilis may also be a matter of much more serious import.

The ordinary signs which we should expect to have from the extent

of the interstitial process met with in syphilis are generally wanting. Ascites especially is not often present. It may not be present when the interstitial change is as marked as in a case of ordinary cirrhosis. This is in part due to the fact that the porta is not usually so much affected as the convex surface of the liver, and also to the greater facilities given for a collateral circulation by the adhesions of the capsule with the diaphragm. It is sometimes possible to make a differential diagnosis between the syphilitic and the ordinary form of cirrhosis by the greater pain on pressure and the rough, lobular feel of the organ. In some cases the differential diagnosis between the syphilitic liver and carcinoma may be extremely difficult, for in both the liver is painful on pressure, and the coarse lobulation of the surface may closely simulate the nodules of carcinoma. There is no single point which is diagnostic of syphilis of the liver, for anatomical changes productive of the same conditions of the organ may be found in a number of other diseases. The evidences of syphilis in other organs is of the most importance in making the diagnosis. The treatment, of course, should be antisyphilitic, and if the condition can be diagnosed in its earlier stages, while the gummata are in the granulation stage, it is possible that the disease may be arrested or even cured. In the later stages, when the gummata are converted into dense caseous, nonvascular masses, and there is a formation of dense bands of cicatricial tissue running through the organ, there can only be an expectation of arresting but not of curing the affection. This is particularly true when the cachexia has lasted long enough to allow of the formation of amyloid. Much good may be accomplished by the use of remedies with the idea of diminishing the ill consequences of the lesions which have already taken place.

VI. SYPHILIS OF THE SPLEEN.

Syphilis may be said to affect the spleen in three ways. In the first form there is a diffuse hyperplasia of the spleen, resulting in enlargement, and in which the changes appear to be only those which are common to hyperplasia of the organ found in other infectious diseases. In the second form there is a general fibrous indurated splenitis, analogous to the diffuse indurations found in the liver and other organs. In the third there is a formation of gummata. Avanzini investigated the condition of the spleen in thirty cases of syphilis in the clinic of Prof. Lang. These cases were either during the period of the primary sclerosis or of an early cutaneous syphilide. In eight out of the thirty cases he could positively determine the existence of a splenic tumor; in only one of these cases was there an immediate subsidence of the splenic tumor under the influence of the antisyphilitic treatment. Schuchter

found enlargement of the spleen in six out of twenty-two cases in early syphilis: three of these had the primary sclerosis combined with a macular syphilide; the others had various early forms of the disease. Of the three cases with sclerosis in which swelling of the spleen was found, in one case the gradual development of the swelling could be distinctly observed, but in both of the other cases it was present at the first investigation. In one of the cases there was a gradual retrogression of the swelling under treatment until the normal standard was reached; in three other cases there was a gradual but slight retrogression of the swelling. Gee, in his article on Enlargement of the Spleen, found the organ enlarged in about one fourth of the cases of hereditary syphilis. He thinks the degree of splenic enlargement may be taken as a sort of index of the severity of the cachexia. The majority of the cases with great enlargement die, but sometimes such children survive; the spleen gradually diminishing in size as the health improves—not diminishing, however, *pari passu* with the improvement of the health, but remaining for a long time a monument of past cachexia. Thus the spleen can often be felt to be enlarged in children of three years old and upward, while bearing the marks of past syphilis. We have, then, sometimes an enlarged spleen as the only sign of an active syphilitic cachexia. Gee seems to have been the first to establish this connection between chronic splenic hyperplasia and congenital syphilis. The swelling of the spleen in these cases may be two or even three times the normal size. The changes found in the organ are those of a diffuse hyperplasia of the connective tissue, with induration. Similar changes in the organ are found in cases of acquired syphilis, along with other manifestations of the disease in the viscera. In all these cases it should be remembered, however, that there are probably always in congenital syphilis, extensive syphilitic lesions of the liver at the same time, and a great part of the spleen-swelling may be referred to an interstitial splenitis brought about by the chronic passive congestion. The frequency with which large amounts of pigment are formed in the large spleen speaks in favor of the probability of this view. Gummata of the spleen are relatively rare; small collections of granulation tissue are frequently found in cases of interstitial splenitis, but it is doubtful if these should be considered true gummata. There is no doubt, from the description, that a number of cases of gummata of the spleen which have been reported were old infarctions and not gummata. Gummata of the spleen must be regarded as a rare affection; the writer has seen but one instance of it. In this, an autopsy at the Johns Hopkins Hospital, along with extensive syphilis of the liver and interstitial orchitis, there was a large caseous gumma of the spleen, associated with chronic induration. Chiari found chronic spleen tumor in all his cases of congenital syphilis, with syphilitic disease of the liver. In none of these cases were

there gummata found in the spleen. In none of the ninety-seven cases of acquired syphilis were any changes found in the organs which could be referred to syphilis.

VII. SYPHILIS OF THE PANCREAS.

Syphilis of the pancreas appears to be one of the rarest forms of visceral syphilis. So far the description of cases of syphilis of the pancreas has been almost entirely confined to the congenital form. In the pancreas the disease appears under two forms. The more common of these is the diffuse form; in this the organ is frequently enlarged, and much firmer and harder than normal. In other cases in which the disease has apparently lasted for a longer time the organ is contracted, its surface irregular, and its condition sclerotic. Birch Hirschfeld was one of the first to clearly describe these syphilitic changes. He found the pancreas altered in thirteen cases out of twenty-three of congenital syphilis. In general it was considerably enlarged, firm, sometimes cartilaginous; on section, white and refractive and more or less homogeneous, the acinous structure being very much obscured. Cruveilhier compares the tissue of the indurated pancreas with a carcinoma of the mamma. Corresponding to this, the microscopic investigation shows a marked growth of the interstitial tissue, which is found not only in the tissue between the great lobes of the gland, but also homogeneously distributed through the gland, compressing the single small acini. The epithelium in such places is in a high degree atrophic. In many cases only the head of the pancreas shows such induration. Huber and Hecker have described similar cases. In adults the same condition of interstitial pancreatitis is also found in rare cases, but up to the present no definite connection between this and syphilis has been established. Beck and Chiari have described an interesting case of pancreatic combined with liver syphilis. In this case—an infant born dead, with extensive syphilis of bones and skin—the pancreas was much enlarged and of an almost cartilaginous consistency. Instead of the normal glandular parenchyma, the chief constituent was a fibrous connective tissue tolerably rich in cells. There were also scattered through the organ small miliary foci which could be regarded as miliary gummata, and which were partly arranged in groups and partly scattered through the gland. In some of the larger of these a slight caseation in the center could be made out. They were most numerous around the duct, especially in the head of the gland and in the wall of the portion of the common bile-duct which is inclosed in the gland. The wall of the common bile-duct in its whole course was thickened by an abundant cellular infiltration and the deposit of miliary gummata. The connective tissue extended along the bile-duct and the

portal vein into the liver and followed the ramifications of these throughout the organ. The gummata of the pancreas are relatively more rare than the diffuse form. They appear in the form of very small miliary nodules, which are generally composed largely of granulation cells with or without slight central caseation, and may be found distributed in all parts of the glands. In a few cases large gummata, with extensive caseations taking up almost the entire extent of the gland, have been described. In one hundred and forty-four cases of congenital syphilis Chiari found syphilis of the pancreas in eight cases. Five of the eight cases showed gummata, the others the diffuse form. In ninety-seven cases of acquired syphilis the pancreas was not affected a single time. Nothing is known about the symptomatology of the disease, either in the congenital or in the rare cases of acquired syphilis. So far syphilis of the pancreas may be considered to be of only pathological interest. Most of the writers on diseases of the pancreas make little or no mention of syphilis.

VIII. SYPHILIS OF THE SUPRARENAL CAPSULES.

The suprarenal capsules appear to be, comparatively speaking, immune from syphilitic lesions. They enjoy the same immunity to this that they do to most of the other infections in the body. Their immunity may possibly be due to the fact that they lie out of the reach of lymphatic influence, but it may also be due to the tissue in some way not affording a favorable place for the development of the syphilitic lesions. We have seen but one case in which the suprarenal glands were affected. This was in a man forty-five years old, with extensive syphilitic lesions of the lymph glands. There were distinct gummatous nodules in the entire chain of the post-mesenteric lymph glands. The lymph glands were enlarged and indurated where distinct gummata were not found in them. In each of the suprarenal capsules there were small, hard tumors of the general character and appearance of gummata. In the right suprarenal capsule the most advanced lesions were found. In this gland in the medullary portion there was a hard, firm tumor mass, which on section seemed to be composed of a whitish, opaque, central portion, and a transparent pearly-gray periphery. The degenerated central portion was sharply circumscribed. From the peripheral portion there were radiating masses of connective tissue extending out into the surrounding tissue. In the left gland there was a similar though very much smaller mass. On microscopic examination of the gland the nodules gave all the characteristics of gummata. The central portion was composed of a dense, necrotic tissue, consisting of broken-down cells and connective tissue. In the periphery, and separated from the center by a sharp line of demarcation, there was a dense connective-tissue capsule, with comparatively few

cells. In a case like this there was a probability of the nodules being tubercles, because these large fibrous tubercles are particularly apt to be formed in the suprarenal glands. The examination of the tissues and the absence of tubercle bacilli clearly excluded the possibility of tuberculosis. There were no symptoms whatever of Addison's disease, nor were the lesions in the glands so extensive that we should have expected it, only a small portion of each gland being destroyed. Cases, however, do occur in which syphilis of the suprarenal glands may be associated with Addison's disease. Such a case has been reported by Beaven, and occurred in a Hindoo. In this case the suprarenal capsules were almost entirely destroyed. Clinically, we do not think that this affection would have any importance. There is no way by which it can be recognized and separated from tuberculosis. Should Addison's disease develop in a subject with well-marked syphilis elsewhere, it might be justifiable to institute a course of antisyphilitic treatment.

SYPHILITIC AFFECTIONS OF THE RECTUM AND ANUS.

By JAMES P. TUTTLE, M. D.

THE course of syphilis in and about the rectum and anus varies from that elsewhere in the body, only so far as it is influenced by the anatomy and functions of the parts. The initial, the secondary, and tertiary lesions are here seen, not with equal frequency, it is true, but sufficiently often to justify us in considering them possibilities in any case of obscure rectal disease.

An initial lesion about the anus in men is strong presumptive evidence of pederasty, and when inside of the rectum in either sex it is positive proof of such unnatural intercourse. In women, the lesion at the anus may be due to accidental contact of the male organ, or to the virus being carried by a leucorrhœal discharge from the vagina into a fissure of the part, but in man there is no such probability.

Chancre.—The proportionate frequency of chancres of the rectum and anus will never be determined, owing to the fact that their painlessness, lack of purulent discharge, and tendency to spontaneous cure cause the large majority of them to be overlooked. Within the rectum proper the initial lesion is most rarely seen. Ricord, Fournier, Vidal de Cassis, have each reported a single case; and of these, Mollière (*Maladies du Rectum et de l'Anus*, 636) only credits one, that of Fournier. Martineau (*Leçons sur les Deform., vulvar et anal.*, pp. 162, 174–176) has reported three cases—one above the internal sphincter, one on its level, and one between the two sphincters.

At the anus the lesion is more frequent. Feulard (*Ann. de Dermat. et Syph.*, 1892, p. 805) observed four cases, three in men and one in a woman, among seventy-five extra-genital chancres.

Clere, Bassereau, and Fournier saw seven chancres of the anus in twelve hundred and thirty-seven cases of the disease elsewhere in men. Peau and Malassez (*Étude sur les Ulcères anales*) say it forms one in a hundred and seventy-seven cases in men, and one in thirteen cases in women. Martin and Carrier saw fourteen chancres of the anus in one hundred and seventy-five cases in women, while Jullien observed twenty-one of the anus and perinæum and four of the buttocks in eighty-two cases in the same sex. The last-named observer did not distinguish be-

tween the anus and perinæum, and therefore his figures can not be taken into account in estimating the frequency of the disease in these parts. It will be seen, however, that the lesion is much more frequent in women than in men, occurring about once in fourteen cases in the former, and once in one hundred and eighty cases in the latter.

Within the rectum the chancre may appear as a mere abrasion or erosion; as a round, indurated ulcer with clean-cut, elevated borders, little undermined and almost dry; or as a brownish, indurated papule. The period of incubation is said by Mollière (*ibid.*, p. 634) to be quite long—a statement which is in harmony with the supposed resistance of the mucous membrane of this part to the venereal virus. The induration may be very slight or extreme, filling the rectum and producing stricture, as in Vidal's case. At the anus the lesion assumes various disguises. It is most frequently seen in the form of a fissure between the radiating folds. Here it is usually of some depth; the edges are indurated and clearly defined. It secretes little pus and is generally painless. Were this symptom constant the diagnosis would not be difficult, but occasionally cases are seen which are intensely painful.

The induration and very slight discharge are the only distinctive features. They occur more frequently upon the anterior border than upon the sides or posterior border. Sometimes the lesion occurs about the margin of the anus as an erosion or ecthyma, and spreads over considerable surface. Mollière (*op. cit.*, p. 639) says that these are not the original lesions but secondary manifestations due to "transformation *in situ*" of the chancre and its induration. They do not itch or burn, but show a tendency to contract and heal rather than to progress. When it occurs upon the muco-cutaneous surface just outside of the anus, the chancre usually appears as a round, indurated dark brownish-red ulcer; it is painless and indolent, secreting little pus and healing very slowly. Again, the anal chancre may appear as an elevated papule resembling condyloma acuminatum. The induration and absence of fetid discharge will serve to distinguish it.

After two to three weeks chancres of the anus usually heal, the only trace they leave being a slight induration of the parts. Unless secondary manifestations appear very early, the slight irritation about the part may entirely escape the patient's memory, and it will be almost impossible to determine the point of entrance of the virus into the system, for there is scarcely any cicatrix or contraction following chancre of the anus. I have seen one case of secondary syphilis of the rectum and anus in which I could distinctly outline the chancreous induration just above and within the border of the external sphincter. According to the patient, the lesion was caused by falling astride a clothes-line. There were unmistakable constitutional symptoms, however, and mercury cured his "rope-burn."

When complicated by chaneroid, chancres take on the nature of the local disease, and may even become phagedenic. Nevertheless, the poisons do not neutralize one another, and systemic infection follows just as surely.

Secondary Syphilis.—Acute secondary manifestations of syphilis within the rectum are rare, but about the anus they are very frequent, and follow more or less closely those of the disease elsewhere. From two to eight weeks after the initial lesion there appears an erythema or erosion about the anus and between the folds of the buttocks. This may be seen sometimes even before the chancre has healed. The latter may pass imperceptibly into the former, thus occasioning the transformation *in situ* to which I have before referred. This manifestation corresponds with the macular eruption on the trunk, and in fleshy people it occurs quite constantly. It appears first as a dull red zone about the anus, which gradually fades into the surrounding skin. As the disease progresses the redness brightens, the epithelium becomes macerated and rubbed off by friction, and the entire erythema becomes an erosion. There are more or less cellular infiltration and thickening of the parts, and the condition may be easily mistaken for an acute eczema. There is little itching or pain, however; the discharge is scanty and purulent, and the thickening is greater than usually occurs with eczema.

Following this condition, and sometimes ingrafted upon it, we find the most frequent lesion of secondary syphilis of these parts, the so-called *mucous patches*. They occur in various forms, are generally associated with similar manifestations about the mouth and fauces, and correspond to the copper-colored syphilides upon the body. They are due to cellular infiltration and inflammatory changes in the epidermis and corium. The epidermis becomes macerated, and they secrete an irritating fetid fluid.

The principal varieties of mucous patches about the anus and rectum are:

1. The small red papules.
2. The fissure-like cracks.
3. The small, round, gray patches.
4. The "plaque porcelainique."
5. The elevated or vegetating patches.

The small red papules occur early in the disease. They are slightly elevated and generally multiple. Their seat is usually upon the mucous membrane itself, but they are also seen upon the mucocutaneous and cutaneous surfaces. These little papules soon break down, and produce erosions or small ulcers. If they occur between the radiating folds they leave the second form of mucous patches—the

Fissure-like cracks. These frequently follow the small red papules, but are not necessarily dependent upon them. They consist in small

cracks in the mucous membrane between the anal folds, covered with a grayish pellicle or sodden granulation. There is no induration about their bases, although their edges are slightly elevated, and when they heal they leave no cicatrix; consequently they can never produce stricture of the anus. They are said by some to be painless, but one has only to see a few of these cases to have his mind disabused of any such misconception. When they involve the folds at the muco-cutaneous border they are quite as painful as other fissures. They resemble simple fissure so closely that they can only be distinguished, and that with difficulty, by their color, raised edges, and the history of the case. In the later stages of constitutional syphilis there sometimes develops a dry and brittle condition of the mucous membrane of the anus. Under these circumstances there are constantly occurring little fissures which are almost painless, without elevated edges, and frequently sluggish, with pale granulations. They should not be mistaken for the mucous patches observed in the early secondary. This tertiary condition is sometimes very annoying on account of the itching—a symptom which is not present in mucous patches. The history of the case, the presence of other secondary manifestations, and the fact that these patches are usually multiple, will serve to distinguish them from chancre.

The small round gray patches occur upon the muco-cutaneous and cutaneous surfaces just without the anus. They are generally multiple, not elevated, and almost dry. In those that I have seen there has been a certain amount of thickening about their bases, so that the skin was not supple as in the other varieties. Hence I am inclined to regard them as ulcerative syphilides. Under the influence of treatment they dry up, drop off a black eschar, and leave a white depressed cicatrix, and this again points to their ulcerative character.

The plaque porcelanique consists in a large, round, elevated patch situated upon a supple base of nonindurated skin. Its color is pearl-white, its surface is smooth and moist, and there is seldom more than one of them about the same anus. They are attached to the skin by a broad flat base, wider than their summit, and, though the skin is supple, there is some redness and inflammation about the attachment.

The elevated mucous patch occurs as a papular eruption, adhering by a broad base to the skin, which is more or less inflamed and thickened. This may be the result of the preceding variety, or it may possibly develop as a small white mucous patch, which proceeds to extend in all directions. I doubt this, however, believing, as said above, that these small round patches are ulcerations. Its surface is lobular, but the sulci between the lobes are very shallow. It secretes an abundant fetid fluid, which bathes and irritates the parts around and below it. This fluid may irritate the papillæ over which the patch is situated and cause them to

hypertrophy. When such takes place, the branching papillæ shoot upward, their vessels multiply and dilate, the summit of the growth increases in width while the base remains the same, and there is developed the cauliflower-growth, distinguished as vegetating mucous patches, venereal warts, or condylomata lata. This is then no longer a simple mucous patch, but a combined growth, a papillomatous wart, upon the surface of which there may be a syphilide, but which in its nature is not entirely syphilitic, and which yields not in the least to syphilitic medication. These are the growths which first led to the application of the term *condyloma* to syphilitic manifestations; they are associated with the disease but not a part of it. Kelsey says, "The secretion from these growths is in the highest degree infectious, and is also auto-inoculable." This latter fact alone would prove their nonsyphilitic nature.

How frequently mucous patches occur inside of the rectum it is impossible to tell, since they produce no symptoms calling attention to them. Mollière (p. 641) has reported one case of the small white patch five centimetres above the anus, and I have recently seen what appeared to be a small red papule about one inch above the external sphincter. Had the patient not had other evidences of syphilis, I should have had no occasion to suspect the nature of this growth. It yielded, however, to anti-syphilitic measures. There is no anatomical or physiological reason why the rectum should not be as frequently the seat of mucous patches as the mouth or fauces, and it is the opinion of the best authors that wider experience and more accurate observation will prove such to be the case.

Secondary Syphilitic Ulceration.—Mucous patches may ulcerate and leave ragged ulcers about the anus and between the folds, such as the French call "rhagades." When these heal they may leave around the anal margin hypertrophied, crenated folds of skin resembling somewhat a cock's comb. The French writers consider this condition as pathognomonic of syphilitic infection. Sir James Paget says of it, "I will not venture to assert that these cutaneous growths are never found except in syphilitic disease of the rectum, but they are very common in association with it, and so rare without it, that I have not seen a case in which they existed, either alone or with any other disease than syphilis" (Medical Times and Gazette, vi, p. 280). I have certainly seen two or three such cases in which there was not the slightest ground to suspect syphilis. "It has been assumed rather than proved," says Kelsey, "that a mucous patch in the rectal pouch may become the cause of destructive ulceration, subsequent cicatrization, and hence of stricture so-called syphilitic"; but, as he goes on to say, this has never been verified by clinical experience, nor is it necessary thus to account for the extensive ulcerations and strictures of secondary syphilis. "Where a constitutional syphilis exists, but without any positive evidence of the disease, an abrasion or localized in-

inflammation may take on the characteristics of syphilitic ulceration, and healing, leave a characteristic syphilitic cicatrix, smooth, white, depressed, and pigmented at its borders" (Tarnowsky, *Arch. f. Dermatol.*, 1879, p. 82). The rectum and anus are subject not only to such abrasions, but also to extensive ulcerations following slight injuries in comparatively healthy people. How much more liable are they, then, to undergo this process when the specific dyscrasia exists!

But one may say these are only the results of traumatism in degraded tissues, and not true manifestations of secondary syphilis. Do we not, then, have true secondary ulcers of these organs? As to the anus there has never been any question of this, nor should there be with regard to the rectum. The march of syphilis is so irregular that it is impossible to set a time limit to any of its manifestations. In rapidly progressing cases the tertiary symptoms may appear within a few months of the initial lesion, while in others the secondary manifestations may occur after some years. I have recently seen a typical mucous patch appear in a patient nearly four years after his infection, and, as ulcerative syphilides are later manifestations, it is reasonable to suppose that they may occur at even remoter periods. Moreover, the symptoms fade so imperceptibly into one another that it is impossible to draw the line either by time or clinical signs where the secondary ceases and the tertiary begins. It is better, therefore, to limit the tertiary ulcerations of the rectum to those which are the sequence of gummata and syphilitic strictures. We may then understand secondary to mean all those due to syphilis, but not sequences of the above conditions. With this interpretation there is no more doubt of syphilitic ulceration of the rectal ampulla than of that of the nose, trachea, or fauces.

"When we consider," says Van Buren, "how rarely the rectum is carefully explored, except when painful symptoms render this measure necessary, and that secondary eruptions are usually painless, the absence of recorded cases of secondary ulceration is not difficult to understand; while the common occurrence of secondary syphilitic manifestations at the other end of the alimentary canal—in the mouth and throat—justifies the assumption that they also occur, if not so frequently, in the rectum" (*op. cit.*, p. 243).

Allingham says that in ninety-nine cases of rectal ulceration and stricture over fifty per cent were the subjects of undoubted constitutional syphilis (*op. cit.*, 1871, p. 241).

R. W. Taylor has reported two cases (*Jour. Cut. and Vener. Dis.*, 1886, p. 424), and Mollière and Fournier (*op. cit.*) speak positively of the nature of these ulcerations. McLaren reports a most interesting case (*Edinburgh Clin. and Path. Jour.*, 1883-'84, p. 625) in which the symptoms of ulceration began nine years after the initial lesion. He saw the patient six years later, and then there were tertiary symptoms as well as secondary

upon his person. Curling (*Dis. of Rect.*, p. 112) and Avery (*Trans. Path. Soc.*, London, vol. i, p. 94) both describe it, and almost every modern syphilographer acknowledges its probability, although few of them have studied the rectal manifestations sufficiently to describe them.

The ulcerative lesion occurs more frequently about the anus than in the rectum. Here they are early features of the disease, occurring frequently with or about the time of fading of the secondary rashes. They begin first as a sort of local inflammatory effusion; as the cellular infiltration occurs they harden, contract, and break down, leaving irregular, elongated, elevated, and indurated bright-red or grayish ulcers, which bleed easily upon touch, but which are comparatively painless. They are usually multiple, their edges are not undermined, and the intervening integument seems perfectly healthy. Their seat is generally upon the verge of the anus, or between the radial folds, where they appear as small, fissurelike cracks. The folds themselves present a gray, sodden appearance, and all the parts are bathed in a thin, fetid secretion. These ulcers are not painless, and without other evidence of syphilis it is almost impossible to diagnose them from simple fissures. Their multiplicity, distinct borders, induration, and the sodden appearance of the folds, will serve to distinguish them.

Syphilitic anal ulcers are usually chronic and stationary, but occasionally they are acute and progressively destructive. Dr. Cripps (*op. cit.*, p. 197) reports an interesting case of this. The patient was a woman in whom, at the first examination, he found a superficial crack at one point only between the anal folds. Ten days later several other angry-looking fissures had developed, and the original ulcer had extended some distance into the rectum and occasioned two alarming hæmorrhages. The patient died shortly afterward of Bright's disease, and doubtless this was the cause of the destructive course of the ulceration.

Inside of the rectum the ulcers occur at a later period, the secondary. The same cellular infiltration of the mucous membrane takes place, and from friction or necrosis it breaks down at more or less numerous points. Here the ulcers are circular, with clearly cut, indurated edges, never undermined, and rarely extending in their early stages deeper than the submucous tissue. If recognized and treated at this stage they disappear, leaving behind no cicatrices or contractions; but, unfortunately, they present so few symptoms at this period that we rarely observe them until they have progressed to the chronic stage. At this time they are characterized by a noticeable loss of tissue; the mucous membrane, the subcutaneous tissue, and the muscular wall of the gut are destroyed in their entire thickness, and the sacrum itself may be laid bare. If they are situated upon the anterior or lateral wall of the rectum they may perforate the peritonæum (Mollière, *op. cit.*, pp. 642, 643). They are surrounded

by inflammatory zones, and hypertrophied glands may be felt as nodosities beneath the mucous membrane. They sometimes spread and encircle the rectum and become fungoid (Kelsey, *op. cit.*, p. 335); but in such cases they are generally associated with some other disease, producing malnutrition, such as Bright's disease, tuberculosis, etc. These ulcers are situated throughout the rectum and colon, but grow less numerous as we follow the bowel upward. Their favorite seat is in the lower portion of the rectum, about one inch above the sphincter.

The points of distinction between them and tuberculous ulcers are well outlined by Sir James Paget (Med. Times and Gazette, 1865, vol. i, p. 279): "They are regular, with sharp, even, well-defined edges, with level bases; they are not excavating, nor do they extend through the submucous tissue; their edges are nowhere eroded or undermined, sinuous, thickened, brawny, or infiltrated; the subjacent tissues appear healthy, except at the rectum. These ulcers are not grouped, and where by extension or coalescence they have lost their first shapes, they have acquired one altogether irregular, and have in no instance even tended toward that girdlelike shape, encircling the canal of the intestines, which is so characteristic in the large coalesced tuberculous ulcer." Notwithstanding the dictum of so high an authority, these ulcers do sometimes involve the entire thickness of the rectal wall, and we have it from good observers that they do sometimes encircle the rectum. I have myself seen a case of secondary syphilitic ulceration of the rectum where the ulcer had extended circularly half around the rectum and through the recto-vaginal wall, producing fistula, and yet there was scarcely any appreciable contraction of the caliber of the gut.

Local tuberculous ulcers are single, deep, with eroded, undermined edges, and not surrounded by any inflammatory zone. General tuberculous ulcers of the rectum are always associated with tubercular disease elsewhere in the body. They are multiple, small at first, with undermined edges, and between them, just beneath the mucous membrane, may be felt small, millet seedlike nodules of tubercular deposit. They increase in number rather than decrease as we follow the rectum upward, and the purulent secretion is much more abundant than in syphilitic ulceration. Even where they have coalesced and encircled the rectum the walls of the latter remain supple and without thickening. Where syphilitic ulceration has existed for some time and involved any considerable portion of the rectum, the walls become thickened, leathery, and stiff. Thus we have both positive and negative phenomena for differentiating these diseases. Among the early symptoms of syphilitic ulceration of the rectum are a feeling of weight about the sacrum, and diarrhœa. The latter is peculiar. The patient on rising in the morning has a sudden desire to defecate. Upon going to the stool he passes only a small amount of pus and mucus.

Later on he may have a natural movement, and at various times during the day he will be called to the closet, only to repeat his early morning experience. If the ulceration involves the muco-cutaneous border, each of these calls may be followed by a dull aching or acute pain of simple ulceration or fissure. In the later stages the pus becomes more abundant and dribbles through the sphincter, causing skin-tabs, condylomata acuminata, and excoriations. These are all the result of the irritating discharge, and may be produced by gonorrhœal, chancreoid, tuberculous, or any other form of rectal ulceration. The amount of constriction associated with these ulcerations varies from the slight narrowing of the canal, due to congestion and inflammation of the walls, to that of absolute occlusion, due to cicatricial contraction or neoplastic deposit. The stricture from secondary ulceration is usually narrow and fibrous, and may not be at the seat of the ulcer at all, but along the edge of the levator-ani muscle. In this case it is due to atrophy and contraction of this muscle, brought about by the irritation of the ulcer, according to Cripps.

Gummata.—These tertiary manifestations may occur in any organ of the body in which there is connective tissue. The rectum is no exception to this rule. No specific or course of treatment has ever been devised which can insure against the possibility of gummata following any given case of syphilis. Esmarch (Pitha and Billroth, Handbuch, Erlangen, 1872), Fournier (*op. cit.*), Bumstead and Taylor (*op. cit.*, p. 607), Zappula (Arch. f. Derm. und Syph., Prague, 1871, p. 62), Ball (The Rectum and Anus, p. 225), and many others, have reported cases of localized gummata in the rectum. One of the most interesting is that described by Zappula and quoted by Ball (*op. cit.*, p. 183). The patient had an ulcer on the glans penis fifteen years previously. Mercurial treatment had been at once adopted, and no secondary symptoms had appeared. Shortly before he was seen by Zappula he began to suffer from pain about the right side of the anus and the tuberosity of the ischium; very soon afterward the symptoms of rectal stricture occurred and fecal impaction resulted. Rectal examination showed smooth, elastic elevations, which appeared to be folds of mucous membrane. At about four centimetres from the anus there was found a painless swelling the size of a hazelnut, globular, smooth, and elastic; it was just beneath the mucous membrane, but not attached to it. Evidently there must have been other and larger deposits above, for the one described could not have produced the obstruction. The symptoms, however, all disappeared under the administration of iodide of potassium. Mollière has reported a similar case (*op. cit.*, p. 645). These neoplasms are rarely seen about the anus, except following ulcerations extending to this part from another, and in the condition described by Fournier as ano-rectal syphiloma. In the rectum they are comparatively frequent, thus reversing the order of the earlier syphi-

lides. They are globular, elastic, cellular deposits in the submucous tissue. In their early stages they are not attached to either the mucous or muscular wall of the gut, but later on they may involve both. They may be simple or multiple, small or of large proportions. They are generally localized, but may be diffused and occupy considerable of the circumference of the rectum. Kelsey says these diffuse gummata are what Fournier has described as ano-rectal syphiloma. This is not the case, however, in my opinion, for the disease described by Fournier, as we shall see later, involves the whole circumference of the rectum, and these diffused gummata do not; they may spread along the axis of the gut, and not circularly at all. Moreover, their nature is distinctly gummatous and not fibrous, as is the case in ano-rectal syphiloma. There is no inflammatory zone about them, but a deposit of fibrous tissue, which increases until it encroaches seriously upon the caliber of the gut. Mollière says they do not suppurate, but undergo a sort of fatty or cheesy degeneration, and thus break down—a statement which has not been verified by other observers. Mathews (*Dis. Rect. and Anus*, 1892, New York) thinks most of the venereal ulcers of the rectum are due to the breaking down of gummata.

R. W. Taylor has reported four cases of such ulcers (*Jour. Cut. and Vener. Dis.*, New York, 1886, p. 226), one of which was situated in the recto-vaginal septum, had ulcerated through and formed a recto-vaginal fistula. It is possible that gummata may become so numerous and so large as to occlude the rectal caliber, as in the case of Zappula, but certainly this is very rare. When they ulcerate, however, there is considerable destruction of tissue in the deeper layers of the gut wall, an increase in the fibrous deposit about them, and upon healing they leave a white, elevated, and contracting cicatrix, which invariably causes more or less stricture of the rectum. I do not doubt that a stricture of large caliber may be produced by the deposit of fibrous tissue in the inflammatory zone about a gumma, and the latter never ulcerates owing to its coming under treatment in time to prevent this; but in such cases the deposit will be absorbed and the stricture disappear under the same treatment. Permanent stricture following gummata of the rectum are almost invariably due to ulceration of the neoplasm, and may, I believe, be prevented if seen before this ulceration takes place.

Ano-Rectal Syphiloma.—This term has been applied by Fournier (*Lesions Tertiares de l'Anus et Rectum*, Paris, 1875) to one of the late manifestations of syphilis. It consists in a specific fibrous infiltration of the rectal wall. He says that it begins in the submucous tissue, and that ulceration of the mucous membrane is a secondary result of the condition, not a part of it. It is essentially a hyperplastic proctitis, tending to a sclerotic stage, such as is seen in the kidneys, liver, and other organs in late syphilis. We distinguish it by the stiff, mammillated, ridgy feel of

the rectum, without ulceration, and generally associated with hyperplastic exudation about the anus. Diagnosis between this and inflammatory deposit is very difficult where no concurrent syphilitic symptoms exist. Its essential phenomenon is that of contraction. Fournier says if "not treated, the rectal syphiloma persists from the beginning; not only persists, but is aggravated and degenerated; it becomes fibrous, and, still more, it retracts itself. Here is the essential, redoubtable phenomenon upon which will depend all the ulterior evolution of this curious pathological process. It contracts, and why? In virtue of the tendency of fibrous tissue, comparable in this to the inodular tissue, to retract without cessation upon itself. The consequence, quite natural, of this progressive retraction is to diminish the caliber of the intestine" (France Médical, October 31, 1874). It is generally due to acquired syphilis, but Ball has reported a case in a boy, ten years, suffering from congenital disease (*op. cit.*, p. 184). Van Harlingen (Internat. Encyc. Surgery, vol. ii, p. 519) says the disease rarely extends beyond two and a half inches from the anus, and neither gives pain nor inconvenience in its early stages. This limitation of the disease is not acquiesced in by other observers. Van Buren and Kelsey, as noted above, consider it a form of diffuse or infiltrated gumma. So also does Maclaren, who reports an interesting case of the disease (*op. cit.*, p. 875). His own microscopic report, however, disproves this, for he says, "The tumors were composed of *dense fibrous tissue*, sparingly supplied with blood-vessels"—a condition not seen in gummata. No specifics were used in this case. Diet, lavage, and local treatment cured the ulceration, while dilatation made the stricture supportable. The weight of authority and the cases reported prove, I believe, that Fournier was right when he described this as a distinct and separate late manifestation of syphilis, independent of and not necessarily associated with any other feature of the disease. In its early stages this form of syphilitic disease presents no symptoms which call either the patient's or the physician's attention to it unless there be some perineal hyperplasia such as I have mentioned above. There is no pain, diarrhœa, or obstruction until it has progressed to considerable thickening of the wall, when the patient will notice difficulty in voiding fecal masses of any size. Nevertheless, those cases in which an early digital examination is made show a thickened, leathery, inelastic condition of the rectal wall, more or less nodular, and extending usually three to five inches upward from the anus. After the contraction has proceeded to some degree, extensive ulceration of the mucous membrane takes place. This ulceration is shallow, and involves the mucous membrane far above the strictured portion. It is due to abrasion in a syphilitic diathesis. It secretes abundant pus, and bleeds easily upon touch or movement of the bowels. The patient complains of constant diarrhœa and a sense of heat and

burning in the rectum like that of dysentery. The ulceration itself closely resembles that of Bright's disease, and can only be distinguished by the infiltrated, thickened condition of the rectal walls, and by the absence of nephritic symptoms.

Rectitis Proliferante Syphilitique.—Under this title Dr. Paul Hamonic (*Annal. Med. Chir. Trans. France et Etrang.*, 1886, ii, p. 3 *et seq.*) has described a condition which he considers a peculiar syphilide. It consists in a villous growth upon the mucous membrane of the rectum. Its characteristics are villous prolongations, fragility, and feeble resistance of the covering membrane. The tumors fill up the rectum but do not tend to form stricture, and the mucous membrane above them is perfectly healthy. I have not observed any such disease. The case described by Kelsey (*op. cit.*, p. 335) might be one of this kind. From a careful study of the paper, however, I am inclined to consider the condition nothing more than simple vegetations, condylomata acuminata, due to the irritating discharges of syphilitic or nonsyphilitic ulceration of the rectum.

STRICTURE OF THE RECTUM.

The so-called syphilitic stricture of the rectum has so long been recognized that it is useless to consume space in arguing for its entity. There is no longer a question of its existence but of its nature. Some authors and many practitioners go so far as to assume constitutional syphilitic infection in all cases of nonmalignant stricture of the rectum, while others hold that it is never a constitutional affection, but the result of a local condition either ulcerous, chancreous, or chancreoid.

Rectal stricture is the result of various conditions, and I would here record my belief that it is dual in its nature and may be produced by any of the venereal affections of the part. It is not just to a pure woman to pronounce her syphilitic because she has a nonmalignant stricture of the rectum; neither should we lightly conclude that a given stricture is nonsyphilitic because there are no patent evidences of the disease elsewhere. I have already quoted the positive assertion of Van Buren, that he has seen chancreoid ulceration followed immediately by stricture of the rectum. Gosselin (*Arch. gén. de Méd.*, tome iv, p. 667) says it is the result of cicatrization of chancroids extending up into the rectum that most frequently produces stricture. Mason has reported thirty-one cases to prove that all these strictures are chancreoid and not syphilitic, but his own table proves the dual source of the condition, as fifteen of the thirty-one cases were syphilitic. Van Harlingen, a close and accurate observer, says (*op. cit.*, p. 518), "Many of the so-called syphilitic strictures of the rectum are, in reality, nothing more than the contraction of chancreoid ulcers." Cripps believes that it is a potent factor in the production of stricture; not through the cicatricial contraction which

follows, but through the spasm, contraction, and atrophy of the levator-ani and circular muscular fibers consequent upon its irritation. I myself have seen one stricture of the rectum follow a simple sore just within the anus. It is no doubt, however, very rare, for the ulceration must be deep, extensive, and have a large amount of inflammatory deposit about it to produce such a result. Simple ulceration of the mucous membrane does not leave a cicatrix upon healing. Hence, in chancroid, the deeper tissue must be destroyed to produce a stricture, and it is seldom that such is the case except in phagedenic ulcerations. On the other hand, the evidence of stricture as the result of syphilis is overwhelming. Rectal specialists almost universally find that about fifty per cent of cases of nonmalignant stricture of the rectum have a near or remote venereal history. Cripps does not believe it is so frequent a cause, since strictures are so much more frequently seen in women than in men, while the reverse is true with regard to syphilis. The other rectal manifestations of syphilis are, however, much more frequent in women than in men; moreover, in the latter, the disease is nearly always earlier treated than in the former, and as stricture is generally a late manifestation it is thus prevented.

As to the form under which syphilitic stricture of the rectum occurs there is a wide difference of opinion. Barduzzi (*Giorn. Ital. d. Mal. Vener.*, No. 1, 1875) holds that stricture may result from the early primary and secondary lesions of syphilis. Mollière (*op. cit.*, p. 278), says that "stricture of the rectum in syphilitic subjects does not recognize true chancre as a cause," and that the case reported by Ricardo was evidently a dual sore. He admits (p. 280) stricture as the result of secondary syphilitic ulcerations of the rectum, but says they are of little extent and susceptible to the action of antisymphilitic medication. Fournier holds that stricture of secondary syphilis is due to ulceration of mucous patches, but, as we have seen, these patches rarely occur high enough to account for stricture at this stage.

All authorities who recognize syphilis as a cause of stricture agree that in the tertiary period it may result from ulceration of gummata and the consequent deposit of fibrous material about them. Of the ano-rectal syphiloma of Fournier and its influence in producing stricture I have already spoken. Trélat describes a category of symptoms producing syphilitic stricture which he calls quaternary (*Prog. Médical*, 1878, p. 473). He says the stricture is due to interstitial deposit in the muscular wall of the gut and not to cicatricial contraction. Of this condition Mollière says (*op. cit.*, p. 282): "They are the most formidable of all, on account of their large extent, which places them absolutely beyond the resources of art. In such cases the interstitial tissue of the muscle is replaced by a connective tissue, which scleroses and destroys by atrophy

the muscular fibers." In the other forms of stricture of the rectum the deposit is in the mucous or submucous cellular tissue, but here it is in the muscle itself, and where it is well established the damage is irreparable.

We may thus, it appears, have stricture of the rectum from chancroid, chancre possibly, secondary ulceration, gummatous infiltration, ano-rectal syphiloma, and, according to Trélat, to quaternary infiltration of the muscles. As the different varieties are susceptible to treatment in a markedly different degree, it is most important to distinguish them.

Pathology.—The most complete pathological study of these strictures is that given by Mallassez (Dict. Encyclop., p. 728), which is confirmed by Cornil (Leçons sur la Syph., p. 412), and Panas and Valtat (Bull. de la Soc. Chir., Paris, 1872, pp. 543 and 572). He says: "The contractures presented all the characteristics of strictures called syphilitic of the lower end of the rectum. The lesions which presented ought to be distinguished as lesions above the stricture, lesions on a level with the contracted portion, and lesions below the stricture. Above the stricture one saw an ulceration having a variable height, and not presenting any trace of mucous membrane, but instead of this some embryonic tissue. At the upper limit of this ulceration, at the point of union between the ulcerated and healthy parts, the mucous membrane was slightly undermined, and in its thickness, between the glandular conduits, existed a certain quantity of embryonic cells.

"The subcutaneous tissue at this level presented also a large number of these cells, and one refound them higher up, even at points where the mucous membrane was entirely healthy. At the level of the contracted portion, at the point most elevated and the least dilatable, which offers to the introduction of the finger and the passage of matter a great resistance, one found, not as is ordinarily taught, a tissue analogous to cicatricial, but a tissue analogous to '*bourgeons charnus*'—proud flesh. This tissue formed of new elements is very vascular, and offered little resistance to instruments when one sought to dilate it. It was only lower down in the widest part of the stricture that one saw fascicles of hard connective tissue surrounded by embryonic tissue, and presenting the characteristics of cicatricial tissue. Between the fascicles of the muscular tissue were found also a large number of embryonic infiltrated elements which reunited themselves at certain points. One saw again, between these, small abscesses which in the beginning are without doubt the origin of the little fistules which accompany, and which appear more often on the level or below the stricture than above it. Finally, in the part which was below the stricture and which corresponds to the sphincterian region, one observed almost always the cicatrices of an old ulceration." In late stricture produced by sclerosis of the muscular tissue we find only a homogeneous cicatricial mass. The peritonæum investing the upper portion of the rectum is fre-

quently the seat of thickening and adhesions, showing traces of local peritonitis. This may become general, and is not an infrequent cause of death in stricture of the rectum.

Diagnosis.—The symptoms of syphilitic stricture of the rectum are extremely obscure before the period of ulceration or obstruction. The patient will have his attention called to it by an unnatural sensation in the parts when at stool. The desire to defecate is not so great nor the call so urgent as previously, neither is the relief so appreciable. The symptoms are of longer duration in syphilitic than in malignant or inflammatory stricture. It is no infrequent thing for a patient to experience them for years before they become marked enough for them to consult a physician concerning them. Before the period of ulceration there is little or no pain, and after this, except at defecation or when the rectum is loaded with hard fæces, it is only slight. Occasionally we find cases in which it is quite intense, but then the ulceration is very deep, or it has involved the anal margin. After ulceration has occurred, the discharge of pus, constant diarrhoea, and inability to void large masses of fecal material without great pain, will be of material assistance in diagnosing the disease.

By digital examination we may learn much even in the early stages of the disease. If the stricture is narrow, annular, with sharp edges, and located below or on the level of the border of the levator-ani muscle, it is probably not syphilitic, but chancreoid or inflammatory. In a syphilitic stricture the contracture is long and tubular, and the walls give the sensation of a stiff, leathery deposit beneath the mucous membrane. It is homogeneous, and not nodular like carcinoma, although in exceptional cases, where the stricture is due to gummata, this may be the case. But here the intervening tissues are healthy, and the mucous membrane may be moved over the nodular mass, which can not be done in carcinoma. After ulceration in syphilitic stricture the condition of the parts is so variable that it is almost impossible to distinguish it from malignant disease except by microscopical examination. The diagnostic point that syphilitic stricture and ulceration do not break down before the finger like cancer, is not reliable. I have seen two cases in which the ulcerated part broke down so easily and bled so profusely that I was constrained to call them cancerous but for their history. Both cases under the microscope proved not to be cancerous, and they recovered under appropriate antisymphilitic treatment.

There are usually dilatation of the rectum and ulceration of the mucous membrane above the stricture. This ulceration gradually extends downward until it involves the whole rectum. The lower end of the rectum may be studded with papillomata or adenomata, and the perincal region is thickened by hyperplastic infiltration to a variable degree. Hypertrophied tags of skin hang about the anus, and through these may be seen

occasionally multiple dry fistulas. Trélat has reported a case in which there were fifteen of these (*Prog. Méd.*, 1878, p. 473). Other small fistulas are seen to open upon the level of or just below the stricture. One might suppose that these were the efforts of Nature to construct a new passage in place of the one pathologically closed, but they are due to points of undermining and small abscesses beneath the mucous membrane; they are within the stricture, subtegumentary not submuscular, and could not possibly relieve the obstructed bowel. Trélat believes these small, dry fistulas are pathognomonic evidences of syphilis. Through a speculum the mucous membrane before ulceration appears of dark, bluish-red color; after ulceration it is ragged, and covered with a grayish pseudo-membrane or sanguino-purulent discharge. The portion for microscopic examination should be taken from the base of the ulcer, or through the whole thickness of the mucous membrane upon its edge.

In rectal syphiloma the whole or greater portion of the circumference of the rectum is involved; so also in muscular infiltration; but in the other forms only a limited portion is affected. In these two forms there is no intervention of healthy tissue between the diseased portions. The whole surface is homogeneous, while in the other varieties there may be several distinct spots of infiltration with healthy tissue intervening.

By attention to these points we may generally diagnose not only syphilitic from nonsyphilitic stricture, but the different varieties of specific stricture from each other, and thus be able to give fairly accurate prognoses of the cases.

Treatment.—The general treatment of syphilis of the rectum differs in no wise from that of the disease elsewhere, except that it is less successful, but the local treatment varies considerably, and is much more necessary here than in other parts of the body. The initial lesion generally heals without assistance; in fact, it comes and goes in many cases without the victim even being aware of its presence. When they are observed, scrupulous cleanliness should be enjoined; a mild antiseptic wash, such as a weak solution of bichloride of mercury, carbolic acid, boric acid, or creoline, should be applied, and this followed by a soothing powder, such as bismuth, aristol, iodol, iodoform, or equal parts of oxide of zinc and calomel. When it occurs between the radial folds as a fissure, it may be painful, and sometimes persist even to chronicity. Such cases demand some stimulation. In the application of this it is important always to bear in mind the exceeding frequency with which obstinate neuroses are produced by irritation or cauterization about the anus and rectum. We should therefore proceed tentatively in these cases, using mild remedies at first, and only resorting to the escharotics in very obstinate cases. We should also remember that the chancre itself may be imperceptibly transformed into a secondary lesion, either a mucous patch or syphilitic ulceration, and

where it has existed for three weeks or longer we should adopt a course of mercurials along with the milder local measures. A small pledget of cotton soaked in balsam of Peru, extract krameria, or a five-per-cent solution of carbolic acid in olive oil, usually relieve the pain and effect a cure in due time. Nitrate of silver, ten grains per fluidounce, gently applied with a camel's-hair brush, is sometimes very effectual. Stronger applications are rarely if ever necessary, for where these fail, together with constitutional treatment, it is better to anaesthetize the patient, stretch the sphincter thoroughly, and trim off with scissors the overlapping mucous folds. If the sore is complicated with chancreoid, and has a tendency to phagedena, we may at the same time apply nitric acid or the actual cautery. It is best, however, to avoid the use of these agents about the anal orifice as long as possible. In all sores about the rectum and anus the bowels should be kept freely soluble. If the chancre is inside the rectum, daily movements of the bowels should be obtained, and each movement followed by irrigation with a fifty-per-cent saturated solution of boric acid. If necessary, these chancres may be touched with slightly stronger solutions than those about the anus, for the reflex irritation of these parts decreases the farther we ascend the gut. Ointments of aristol or iodoform, applied through a hard-rubber ointment carrier, may be useful in these cases. As a rule, however, these ulcers come and go, and the secondary symptoms manifest themselves without the initial lesion ever being discovered.

When secondary symptoms manifest themselves, the treatment of course becomes constitutional. I believe I am in accord with the best syphilographers in never administering mercury till these symptoms have appeared. The only apparent exception to this rule is in those cases of "transformation *in situ*" mentioned above. In this stage of the disease mercurials compose the large part of the treatment. I shall not consume space here to give even an outline of the general treatment of syphilis, as it will be thoroughly treated of elsewhere in this volume. In my own practice, hypodermic injections of mercuric chloride, inunctions, or mercuric baths, form the first course of treatment. It is important in syphilis of the rectum to keep the bowels soluble, but it is equally as important to keep them as much at rest as possible between the periods of going to stool. The internal administration of mercury keeps up peristaltic action of the bowel, and consequent spasm and unrest of the parts about the rectum and anus. It is desirable to avoid this, and by the use of other methods it can be accomplished, at least in a large measure.

I begin with one-twenty-fourth grain of bichloride of mercury hypodermically, increasing the dose each day until distinct physiological symptoms are produced. In nearly five hundred injections I have never had an abscess form in any case, although some of my friends have not

had such favorable experiences. The secret lies in freshly prepared and filtered solutions of four to six grains per fluidounce, in making the injections into the deeper tissues, and in thorough rubbing of the parts after injecting, in order to disseminate the fluid. The subscapular folds are the best points for making this injection, although the nates may be used if much soreness should result in the subscapular regions, before the constitutional effects have been produced. Occasionally a slight diarrhœa will be produced by this method, but it is rare, and easily checked by small doses of opium. I have not found it necessary to use morphine in combination with the sublimate on account of pain, as is advised by Lewin.

Of the inunction and bath, the protiodide, red iodide, chloride, and other preparations of mercury, it is unnecessary for me to speak. Their uses are familiar, and will be found under the head of *The Treatment of Syphilis*. It is necessary to remember that all these remedies are rather slow in producing effects upon syphilitic manifestations about the rectum and anus. After the physiological effects of the mercury have been produced, it is my practice to put the patient upon mixed treatment, supplemented by tonics, cod-liver oil, and regulated full diet.

The local treatment of these secondary manifestations consists in cleanliness, the protection of the healthy from the diseased parts, stimulating, soothing, or drying applications, such as in the initial lesions, according to the indications at the time.

In the extensive secundo-tertiary ulcerations these remedies will often fail notwithstanding there is no marked stricture of the part. It then becomes necessary to do something more radical. The indications are for perfect rest and protection to the parts; and if rest in bed and milk diet have failed, the only way this can be given is through a temporary colotomy. It is surprising to see how rapidly these ulcers heal, and to what a degree the health of such patients improves, when the irritation of fecal passages has been removed. The operation is fully described in works on surgery and diseases of the rectum. R. W. Taylor (*Jour. Cut. and Vener. Dis.*, 1886, p. 228) advises the insufflation of equal parts of bismuth subnitrate and iodoform for these ulcers. It is useful, no doubt, but it requires the introduction of a speculum, which is painful, and which scrapes most of the powder off when it is withdrawn. I have recently used iodoform ointment, together with irrigation, very successfully in two cases.

Upon the tertiary syphilitic lesions of the rectum and anus mercury has little effect. Iodide of potash, continued in increasing doses, is here our sheet-anchor. Nevertheless, a sharp and decisive course of mercury should be carried out in every such case before we set it aside as useless. I have seen three cases of tertiary syphilis of the rectum, gumma, stric-

ture with ulceration, and syphiloma, greatly benefited by the use of mercurials, and the chance of its acting so should not be lost to the patient. Ulcerated gummata should be scraped out with a Volkmann's spoon, and afterward treated by irrigation as has been mentioned above. The rectal irrigator is described under Gonorrhœa of the Rectum in the previous volume of this work. The strictured portion of the canal should be dilated persistently with Wales's soft-rubber bougies. These should never be forced tightly into the stricture. There is danger of perforating the peritonæum, and of setting up severe peri-rectal inflammation in using force with the rectal bougies. Where the stricture is narrow and inflexible, and unaccompanied with much ulceration, posterior proctotomy sometimes gives excellent results. The objection to this is, that it leaves an ulceration in syphilitic tissues which may take on the nature of the disease, produce great destruction of the parts, and eventually leave a denser, wider stricture than before. If the patient is thoroughly under the influence of antisiphilitic medication, this is not likely to take place. Where there is a long, narrow stricture of the rectum, with much ulceration and degeneration of the tissues, so that it breaks down before the finger like cancer, the bougie and posterior proctotomy are of little service. Since Kraske has demonstrated the feasibility of removing large portions of the rectum, there has been a tendency to practice excision upon these cases. I am not convinced of the wisdom of this method. We can not be certain that the portion of the gut brought down will not be ulcerated; the operation is exceedingly long and dangerous; the peri-rectal tissues are syphilitic as well as the rectal, which militates against immediate union—a great consideration in this operation—and after the excision is accomplished the patient has only partial control of the bowels. It seems to me that the results do not justify the risk assumed. Inguinal colotomy is infinitely safer, and the result almost as comfortable for the patient. At the same time proctotomy may be done, and in the majority of cases the ulceration of the rectum will heal, and if the bougie is judiciously used during this period the organ will be restored to a good caliber. If deemed advisable, the artificial anus may be eventually closed. I have lately done this operation in such a case with the promise of excellent results, there remaining now only the closure of the inguinal anus to be done. Divulsion and the cautery should not be thought of in these cases.

In ano-rectal syphiloma, and the quaternary lesions described by Trélat, if the treatment is begun early it is usually very effectual; but if the disease has advanced to atrophy of the muscles and ulceration, little hope can be offered to the patient except thorough excision or a permanent artificial anus. Iodides should be given freely in these cases, the rectum irrigated frequently with hot boric-acid solution to stimulate the

circulation, and bougies passed every third day. These bougies should not be forced in. They should be of a size which will fit easily in the strictured part, and they should be left in from a quarter of an hour to two hours, according to the irritability of the patient.

CONGENITAL SYPHILIS OF THE RECTUM.

Anal and rectal lesions are among the earliest and most frequent manifestations of hereditary syphilis. They may appear at any time from birth to twelve months thereafter. I have seen one case of syphilitic erythema with numerous dry fissures in a child three days old.

The first of these lesions is an erythema, sometimes erosion, which may be easily mistaken for chafing and irritation by feces and urine. The skin is red or copper-colored, elevated and thickened about the anus, and bathed with a fetid discharge. Between the radial folds are numerous little dry fissures which do not extend above the sphincter. Ulceration develops in the first three or four months if the disease is not treated, but it has never been my fortune to see a mucous patch in a child under two years of age. Other specific lesions soon manifest themselves to corroborate the diagnosis if it be in doubt.

From the first to the fourth year tertiary symptoms manifest themselves. A very interesting case was presented to my clinic lately in the person of a little girl, two years of age, who had suffered from shortly after birth with inflammation about the rectum. Examination showed tubercular syphilides upon the folds of the nates, a distinct, thickened and leathery condition of the rectal wall, and three well-marked gummata in the organ. There were erysipelatous patches of papular syphilides at several points upon her body. The father denied venereal taint, but at the time he had a tertiary eruption upon his body, and a small syphilitic ulcer in his rectum. They have both improved rapidly under treatment, and promise good results.

The *treatment* for congenital syphilis of the rectum and anus is the same as that for the disease elsewhere. Mercuric inunctions either through the stomach bandage of the infant, or through rubbing, followed by iodide of potassium and local applications, such as have been mentioned above, suffice to cure most of these cases, but in some the general system is so undermined by the disease that nothing is of avail. If the rectums of the children of suspected parents were systematically watched, I have no doubt many of these cases would be recognized early enough to avoid the disastrous results of the disease in early life.

SYPHILIS OF THE GENITO-URINARY SYSTEM, MALE AND FEMALE.

By EUGENE FULLER, M. D.

I. SYPHILIS OF THE GENERATIVE ORGANS.

THE MALE ORGANS.—THE PENIS.

The Initial Lesion—Situation.—In the vast majority of instances an abraded area on the penis furnishes the germ of syphilis the necessary lodging place from which general systemic infection ensues. The exact site of the infection and of the consequent initial lesion depends on the location of the abrasion. If a man on exposure does not have or fails to produce an abrasion, he escapes syphilitic infection. The study of the subject of abrasions, therefore, is an important matter not only as regards prophylaxis—which does not here concern us—but also in determining the topographical distribution of penile chancre. The mucous membrane of the foreskin offers the most likely field, since in so many individuals this portion of the anatomy is from neglect, oftentimes dating from childhood, the seat of chronic inflammatory changes which rob the mucous membrane of its natural smoothness and elasticity, thus allowing it to become denuded on the occasion of slight friction or ruptured from moderate tension. The same causes account for the frequency of chancres in the sulcus behind the corona and along the line of junction of the mucous membrane of the foreskin with that of the glans penis. In such individuals the simple wiping off of the smegma with cotton, in order to expose the mucous membrane, will often bring blood. In these cases also it is common, on careful observation, to see little folds of mucous membrane bound together by false adhesions, the result of former attacks of balanitis. A little tension on this area will straighten out these folds, leaving a raw, bleeding line as a result. Another favorite site for abrasions is on the frænum, which in some individuals is very prominent, standing out as a sharp ridge when the penis is erect and the foreskin retracted. I remember one instance where an exaggerated prominence of this condition of the frænum was on the verge of causing a marital separation, the wife complaining that she suffered during intercourse as if she was being cut with a knife. On dividing the frænum all complaint ceased. The junc-

tion of the cuticle of the foreskin with the mucous membrane is also frequently the site of chancres. The epithelium on this part, when the organ is in the state of repose, is subjected to constant friction, which, together with the dribbling of urine after micturition, often occasions a chapping of the parts, thus allowing an easy access to the virus on exposure. The prominent border of the corona glandis is at times abraded. It is rather unusual, however, for the part to suffer as the result of a single coitus, as the epithelium, although soft and sensitive, is apt to be tough. Hence the observer in these cases usually gets a history of repeated and prolonged indulgence. Other portions of the glans are much less exposed than the corona, consequently lesions there are rare. Chancres of the sheath of the penis are not very common, as the skin will stand much friction in this locality without injury. When they do occur, their position is usually determined by a preceding attack of herpes progenitalis, or by an inflammation existing in connection with a hair follicle, or a sebaceous gland, causes which of themselves produce an existing abrasion or easily allow of a fresh one being made.

Secondary Syphilitic Manifestations on the Penis.—The secondary eruptions on the cutaneous portion of the penis are not usually as general as on the trunk or limbs. They customarily, when developed, present a macular appearance. With these modifications there is nothing to be said on secondary cutaneous lesions of the penis which does not apply to the general cutaneous surface, which topic is thoroughly treated elsewhere. The secondary lesions of the mucous-membranous portion, however, are deserving of some special notice. In individuals who have been circumcised, or who habitually wear their foreskin retracted, thus keeping the parts dry and free from glandular deposits, syphilis in its second stage causes little inconvenience. It appears usually as papulo-squamous or macular lesions, the tendency to scaling being marked. There is moderate infiltration in the area involved. The tissue included by the original chancre seems to offer an attractive spot for these secondary manifestations, the tissues undergoing a re-engorgement, usually, however, of a moderate character. Such lesions are transient, and leave no pathological signs to mark their previous existence.

In individuals where the glans is covered by the prepuce the case is different, owing to the new element of moisture which is introduced. The lesions which under other circumstances are dry and squamous become moist, or, in other words, mucous patches. Then, again, moisture, which consists largely of urine dribblings and sebaceous glandular secretions, unless great cleanliness be observed, is, owing to its chemical decomposition, an agent productive of inflammatory changes in the mucous patches. These changes cause, in the first instance, an increase of the induration into the tissues underlying the plaque, thus tending to ele-

vate it. Then, if the irritation still continues and no treatment is administered, a hypertrophy of the infiltrated subcutaneous stricture may ensue, giving rise to warty prominences called condylomata. These condylomata are not very common in the male. In connection with the female external genitals, however, they are much more frequent, as will be seen later on, when we consider that subject. This is because in the female another element of irritation besides moisture exists in a marked degree, which in the male is not prominent, namely, friction between the parts. More rarely, instead of infiltrations and hypertrophy resulting as a consequence of irritation in these conditions, ulcerative changes with loss of tissue occur. Such changes, however, which are the rule with later syphilis, are the exception during the secondary period; still, in some cases one sees such a blending of late secondary manifestations with precocious late ones that it may be hard to tell where the former ends and the latter begins.

Late Surface Manifestations on the Penis.—It is not very unusual for late syphilis to attack the sheath of the penis or its prepuce, and in these attacks the site of the initial lesion seems to be a very vulnerable spot; the glans, however, is rarely involved. Within the last year I have had two cases under my care. In one the syphilis was three and in the other four years old. In both cases there were multiple lesions in connection with the sheath of the penis and the prepuce, while in one of these cases there were numerous other gummatous cutaneous lesions coexisting. These lesions appear suddenly and spread rapidly, hard rupia-like crusts forming over them in case they are kept dry. When these crusts are removed a sloughing surface is exposed, the undermined edges of the lesion showing it, when fully exposed, to be much more extensive than the investigator had expected. These manifestations, however, extend by involving the surface, in contradistinction to the deep structures. Under appropriate treatment they slowly and stubbornly yield, healthy granulations at last springing up. It is wonderful, after thorough resolution has taken place, to note how little eventually remains to mark the site of often very extensive lesions. Jullien (*Mal. Vénériennes*), however, reports that the cicatrix resulting from these gummatous cutaneous lesions sometimes is so adherent to the deeper structures that it causes a traction on and some deflection of the organ when in a state of erection. The great mistake is to treat these cases by thorough cauterization, on the supposition that they are chaneroids, which they strongly resemble under phagedenic conditions.

Differential Diagnosis.—The initial lesion is ordinarily to be distinguished from herpes progenitalis, chaneroid, benign lesions, balanitis, tuberculous lesions, malignant growths, and later stages of syphilis.

Herpes.—The practitioner is very frequently consulted by nervous

individuals who, by watching themselves overcarefully after a suspicious intercourse, become alarmed over the appearance of a crop of herpetic vesicles. A patch of herpes and an initial lesion are so unlike that no trouble should be experienced in making a correct differential diagnosis. Between an inflamed spot, however, caused by a preceding outbreak of vesicles and a commencing initial lesion, it is often, in the absence of an intelligent history, difficult to make a positive immediate diagnosis. A little observation will definitely settle the question, as the superficial abrasion left by herpes, if not further inflamed, very quickly gets entirely well, leaving no induration.

Chancroid.—The differential points in the diagnosis between the initial lesion of syphilis and the chancroid, or simple chancre, have been so elaborately set forth in the article on Primary Syphilis as to render unnecessary further reference to the subject.

Benign Lesions.—By these are meant simple traumatisms or excoriations, occasioned by vigorous coitus, usually when the vagina is narrow. Such lesions occasionally become indurated and heal very slowly, oftentimes taking upon themselves many of the characteristics of the initial lesion. In such cases a positive diagnosis excluding syphilis can only be made by keeping the patient under observation for a time, in order to see whether any secondary manifestations develop. Within the last six months I have had under observation two such cases, which eventually were demonstrated to be benign. In both of these not only I myself, but Dr. Keyes also, was inclined at one period strongly to the diagnosis of hard chancre. These cases illustrate the soundness of the general rule, which is, to make a positive diagnosis of syphilis only when secondary symptoms follow the primary lesion.

Balanitis.—This condition sometimes in uncleanly individuals, in whom the prepuce can not be retracted, causes the appearance of nodules or plates of induration, which can be felt by pinching the cutaneous tissues of the foreskin, generally in the neighborhood of the corona. These nodules, if nonsyphilitic, together with the existing balanitis, generally disappear speedily after a few treatments with an antiseptic subpreputial douche, thus determining the diagnosis.

Tuberculous lesions are rare on the penis. They are mentioned here simply for completeness. Careful investigation into the history of the case, together with the demonstration of the existence of the tubercle bacillus, would positively decide the nature of the lesion.

Malignant Growths.—Primary epithelioma of the glands, less frequently of the prepuce, is not very rare in advanced age. In its early stages it sometimes resembles the initial lesion quite closely. This resemblance, however, does not last long, as the growth soon involves the whole glands and quickly extends along the corpus spongiosum, making the ure-

thra feel like a pipestem. The primary lesion never extends in this manner. These points, together with the history of the case, and the fact that the lesion is not favorably influenced by syphilitic treatment, soon prove its true character.

Secondary manifestations may sometimes be mistaken for the primary sore. If, however, a careful examination be made, such a mistake would seem hardly excusable. A case came to me, some time since, which illustrates this error in a marked degree. An Englishman who had almost completed a tour around the world presented himself, stating that I would probably be interested in his case, owing to its rarity, as he had caught syphilis, according to the medical opinions he had received, three times in six months during his travels. He further stated that his last chancre had not as yet entirely healed. On examination, I found the remains of an indurated mucous patch under the foreskin, together with numerous generally distributed secondary lesions which had probably existed from two to three months. This patient on his journey had endeavored to consult the best medical advice obtainable. Tertiary cutaneous lesions might possibly at their very commencement, in the absence of any previous history, be confounded with the initial lesion. This mistake would, however, very soon become apparent, owing to the progressive phagedenic changes which speedily ensue.

Secondary penile syphilis may also be more or less closely imitated in appearance by eczema, psoriasis, lichen planus, erythema multiforme, scabies, balanitis, vegetable parasitic conditions, herpes, and traumatisms. When hypertrophic changes take place, a differential diagnosis between syphilitic condylomata and venereal warts is often called for. A lengthy consideration of the special points in the differential diagnosis of most of these affections could not be entered into here without a special study of their general characteristics, which study belongs to dermatology, and will be considered in the volume of this series devoted to that department. A few general remarks, however, will not be out of place. In studying syphilis, and especially secondary syphilis, the thorough observer never confines his attention to one organ, but inspects the whole visible anatomy. By so doing the diagnosis, in many cases, can be positively and speedily made, where otherwise a question of doubt would remain until the effects of various treatments had been tried. Take, for example, a lesion on the penis where there is a question of diagnosis between secondary syphilis and eczema. If the disease is syphilis, one will surely find confirmatory evidences somewhere on careful general inspection. If it is not syphilis, not only will these evidences be lacking, but also in all probability further signs, some of them typical in character of eczema, will be discovered. In this way a positive diagnosis is made. In some of these affections, as balanitis, herpes, and traumatism, the negative evidence afforded by find-

ing no traces of secondary syphilis on general inspection, together with an absence of a satisfactory history, would be sufficient to incline one's opinion very strongly against syphilis, and to induce a form of treatment anti-syphilitic in character. Of course, it is only very rarely that this last group of conditions can so simulate secondary manifestations as to make a differential diagnosis a matter of any question.

In diagnosing simple from syphilitic condylomata, besides the considerations just stated, it may be well to mention a few special points. In the first place, the pathology of the two conditions should be compared. They are both hypertrophies of the papillary layer of the skin as the result of persistent inflammatory conditions. With syphilis the hypertrophy exists, as has been mentioned, in connection with a mucous patch of long standing which has been subjected to considerable continuous irritation. As a result, there is much infiltration of the structures forming the base of the hypertrophy. The growths under such conditions do not spring from a slender pedicle, but from a broad surface usually corresponding to the area of the patch. Simple condylomata also result as a consequence of a continued irritation of a light grade, caused by the presence under the foreskin of the decomposed products of the natural secretions and excretions. Here, however, there is no denuded area and no marked infiltration necessary as a starting point; but the hypertrophies, when recent, are seen sprouting up here and there in little delicate tufts. These tufts grow generally quite rapidly if the parts are still kept moist, branching out like a cauliflower from the slender pedicle. After a time these cauliflowerlike excrescences increase so extensively that they impinge against neighboring analogous growths, thus forming a rather extensive surface. The superficial appearances of these two conditions under these circumstances may bear a marked resemblance. If, now, one takes a curette and applies it rather vigorously, the growths, provided they are simple in character, are readily removed, leaving little punctate, bleeding surfaces. After the bleeding is checked the feel of the part occupied by the growth is quite natural, but little infiltration existing, and that of a general character. In the case of syphilitic condylomata, however, curetting accomplishes different and much less satisfactory results. The growths are found to be tough. On scraping them the tops are removed, disclosing the broad infiltrated pedicles, which resist all but the most vigorous scraping. The bleeding, however, owing to the infiltrated condition of the parts, is usually less than in the first instance. The feel also shows the area involved to be hardened and nodular. There is another instance, very unusual, however, in which a condylomatous condition of the penis may exist, and that is in connection with epithelioma of the part. I have seen but one such case. Here the growths, after reaching a certain stage in their development, were attacked by ulcerative

destructive processes in a manner which made the question of diagnosis an easy matter.

As regards *late cutaneous syphilis of the penis*, there is little besides chancre, and possibly malignant growth, with which it could be confounded. Between it and chancre, however, there is often a very close resemblance, so that it is well to put the practitioner on his guard. With chancre the history of a very recent suspicious intercourse can be obtained, together with much pain in connection with the sore. With the syphilitic lesion there is generally an absence of any marked pain, and usually no history of a preceding suspicious connection. There is also the history of former syphilis in most cases, and often, as has been stated, corresponding lesions in other parts. Then, again, phagedenic changes, coming on very suddenly, are associated with this form of syphilis in individuals who often seem to be in the enjoyment of robust health—a state of affairs that one would hardly expect to find with chancres under like conditions. Then, again, if the lesion is syphilitic, treatment applicable to chancres only makes matters worse, the iodides and mercurials alone proving efficacious, even these acting sometimes very slowly.

Syphilis of the Corpora Cavernosa.—This structure is attacked only by late syphilis, and very rarely at that. The lesions are customarily situated nearer the extremity than the base of the organ. They appear as nodules, varying from the size of a pea to that of a hazelnut. Their advent is very insidious, as they are accompanied by no pain or tenderness. What calls the patient's attention to them is the fact that they interfere with uniformity in erection, producing a state of chordee during such a condition. The organ when erect is consequently deviated, generally laterally, but sometimes in an upward or downward direction, according to the situation of the lesions. Ricord relates a case of this condition where several of these lesions existed in one of the corpora cavernosa, the result being that on erection the penis presented the appearance of a ring. These nodules do not appear to readily break down, as do the late cutaneous lesions, thus forming communications with the surface or with the urethra. I have never seen such a complication in this condition. These syphilitic lesions are to be carefully distinguished from the condition known as chronic circumscribed inflammation of the corpora cavernosa, fully described by Van Buren and Keyes and others. This last disease apparently occurs more frequently associated with gouty or diabetic individuals than otherwise, although I have seen it in a number of instances where I failed to discover any trace of these two assumedly predisposing affections. It is sometimes impossible to make a differential diagnosis between these two conditions without recourse to treatment directed toward syphilis, under which circumstances the lesions, if gummatous, disappear, otherwise remain unaffected. Still, there is a point of difference

in the appearance of these two lesions. The chronic circumscribed inflammation occurs usually as rather irregularly shaped plates of hardness, while with syphilis the manifestations are liable to be rounded. Both these conditions are painless, except for the disturbances they cause during erection.

SYPHILIS OF THE URETHRA.

The Primary Lesion.—The inoculation of syphilis at the meatus is not very uncommon. The chancre may very rarely have its site in the fossa navicularis. Any deeper point of inoculation, certainly as a result of sexual intercourse, does not seem to exist. Chancres at the meatus and in the fossa navicularis have a few characteristics peculiar to themselves, owing to their position—that is, the infiltration in this part subsequent to the inoculation serves in a greater or less degree to temporarily obstruct the flow of urine. Sometimes, in the case of individuals where the natural meatus is narrow, this obstruction may become so great as to be serious. In such cases surgical interference, or, what is much better, early mercurial treatment, may be called for. Cutting or divulsing is not advised unless immediate relief is required, since by these measures the chancre is inflamed and the infiltration increased. Secondary syphilis of the urethra is met with every now and then, the symptoms set up being those usually of urethritis, more rarely of stricture. It seldom gives rise to much trouble, unless subjected to injudicious forms of treatment, which act as irritants.

In 1873 Henry Lee, of London, delivered two Lettsomian lectures on syphilitic urethral discharges. Since then a number of articles have appeared on the subject. This form of urethritis gives rise to little pain or discomfort other than that which a urethral discharge by its mere presence always occasions. The discharge itself is inclined to be watery in character. It is usually found in connection with individuals whose urethræ have previously been attacked by gonorrhœa, so that in some cases it may be an open question whether the urethra is the site of a special secondary attack, or whether the cachexia and the febrile disturbances consequent on the advent of secondary syphilis have not in themselves been sufficient to stir up granular urethral lesions resulting from former gonorrhœa. However, the fact that true mucous patches in some of these cases do occur can be demonstrated by the endoscope. If the mucous patches along the urethra are inflamed they become infiltrated and nodular, causing more or less stricture. It may be well to relate here the history of one of these cases, taken from my record-book. A young man presented himself complaining of stricture and moderate gleet. Six months previously he had had a chancre, followed in due time by an eruption. For this he had taken a small amount of mercurial. The eruption disappeared, but in the course of a month he began to notice a discharge from the

urethra. For this an astringent injection had been prescribed. The discharge, however, grew worse. Then, apparently, in the struggle to cure the discharge, the fact that syphilis existed seemed largely to have been forgotten. After several injections had been used without favorable results, sounds were brought into play. It was soon found that the urethra, instead of taking the same or increasing sizes in sounds, speedily contracted in caliber. The question of urethrotomy was then presented to the patient. After that different medical advice was sought. When I saw the patient, much pigmentation and some induration existed at the site of the initial lesion, which was in the sulcus just behind the corona. There were also specific signs in the throat and elsewhere. An endoscopic examination of the urethra showed, about half an inch from the meatus, an extensive mucous patch covered with a light grayish film which could with difficulty be scraped off, leaving an oozing surface. The base of this patch was much infiltrated, causing a dense stricture. Local treatment was stopped, and large doses of mercurials administered, with the result that all the urethral discharge soon ceased. Some time afterward a careful examination of the urethra failed to detect any stricture, though a certain amount of lividity of the mucous membrane, marking the site of the plaque, still remained.

It is common for the urethra in individuals in the secondary stage of syphilis, when the use of sounds is attempted to dilate previously existing strictures, to take on as a result of such instrumentation, although no local evidences of syphilis previously existed, a low-grade inflammation, accompanied by such an amount of brawny infiltration that the walls of the urethra from the outside present something of the pipestem feeling.

Late urethral syphilis is very rare. It does, however, occur, Fournier, in particular, having recorded some well-authenticated cases. On two occasions I have had to deal with what at first sight seemed to be illustrations of this affection, but in both more extended study proved the first impression to be mistaken, one of them turning out to be chancreoid and the other cancerous. The usual history of gumma in this locality is that the lesion, which is generally situated not far distant from the meatus, first manifests itself by a rather free urethral discharge. The lesion causing the discharge is liable to extend, often involving the meatus and much of the glans. Sometimes it invades the whole thickness of the corpus spongiosum. In such instances it is common for the destruction of the tissue to be so extensive as to cause fistulous openings. These lesions frequently become markedly phagedenic, the same as the corresponding cutaneous manifestations, and under such circumstances yield very slowly to treatment.

Differential Diagnosis.—If one bears in mind the general characteristics of urethral chancre, it can not well be mistaken for any other con-

dition unless it be commencing epithelioma, and possibly the effects of traumatism, tuberculous infiltration, or mucous patches. Epithelioma starting at the meatus may so nearly imitate a chancre that mercurial treatment will be called for in order to establish the differential diagnosis. Nothing need be said regarding traumatism other than that, when accompanied by succeeding inflammatory changes, they may resemble the initial lesion. Tuberculous infiltration extending from its customary focus in the prostatic urethra forward as far as the anterior urethra, thus invading the region in which chancres exist, is very rare, and when it is present the chronic history of the disease, together with the associated incontinence of urine, would be sufficient to rule out all idea of chancre. An inflamed mucous patch, such as was seen in the case just previously related, might have been mistaken for a chancre if the general inspection of the patient had been wholly neglected.

Secondary urethral syphilis may be mistaken for simple or gonorrhœal urethritis or stricture resulting from these conditions, and that such is often the case has already been pointed out. The general inspection of the patient, together with the local examination, ought to suffice in determining the exact condition, especially when all ordinary methods of treatment fail to produce satisfactory results, unless, perchance, corrosive-sublimate irrigation be used for antiseptis.

Late urethral syphilis often requires much skillful attention before it can be positively diagnosed. It may be closely simulated by chancre and cancer. The question of tubercle also should be borne in mind.

Chancre of the meatus is very obstinate as regards treatment, and frequently extends some distance up the urethra. It is also quite destructive and very painful. It usually infects neighboring spots, forming new, nonadjacent sores. With the corresponding syphilitic sore, however, there is little or no pain. Its advent is insidious, and bears no relation to any recent coitus. It usually begins within the urethra and appears at the meatus by reason of extension. It involves the surrounding structures more deeply than does chancre.

Epithelioma is a slow process compared with late syphilis in this part. It is more painful than syphilis, though less so than chancre. There is much more surrounding infiltration. In epithelioma, when a red granular base to the ulcer exists, no evidences of repair follow. When such appearances are found with the syphilitic lesion repair is quite rapid. Both of these processes may form urethral fistulæ, though this tendency is greater with cancer than with syphilis. With cancer, condylomatous excrescences often coexist along with ulcerative processes. I have in alcohol a penis representing this condition. Here the condylomatous element became so abundant that but little urine could eventually pass the meatus, most of it flowing out of numerous fistulous tracts occasioned by

cancerous ulcerations. This hypertrophic condition in connection with gumma apparently never exists. There might be a question between tubercle and cancer in this part, though hardly one between tubercle and syphilis. If, however, a question should arise between these conditions, which could not be settled otherwise, recourse should be had to the microscopical examination of a section of the tissue in dispute. One every now and then sees the statement that the entire penis may be destroyed by the ravages of late syphilis, a case of this nature reported by Jessop, of London (*Brit. Med. Jour.*, Dec. 19, 1868), being usually referred to as authority for this assertion. Such an event may possibly occur; still, the case reported by Jessop seems to me on investigation to be unworthy of much consideration, as the history he gives does not correspond to one of syphilis. Then, again, some of his statements are so peculiar that the reader is forced to conclude that the reporter had a rather inexact knowledge regarding syphilis itself.

SYPHILIS OF THE PROSTATE.

This gland seems to be peculiarly exempt from syphilis in any of its stages of development. A few years ago Guyon and his pupil, Leanois, (*Annal. des Mal. des Organ. Genito-Urin.*, Feb., 1889), published an article entitled *Prostatismus Vesicale*, in which prostatic hypertrophy occurring in elderly individuals was considered to be but a part of the general process of arterio-sclerosis, which condition, according to some authorities, occurs more frequently in individuals who formerly have had syphilis than otherwise. Within the last year, however, Casper, of Berlin (*Berliner klin. Woch.*, 1892, No. 5), as a result of very extended investigations, showed that these two conditions have no connection, and that they are rarely found associated. Therefore, not even in this indirect way does syphilis seem to affect this part. Of course, the gland might become involved by the extension of a neighboring gumma, but I do not know that such a case has been recorded.

SYPHILIS OF THE SEMINAL VESICLES.

No observer, as far as I can find, has recorded an instance where syphilis has been encountered in connection with these organs. It is only, however, within the last few years that genito-urinary surgeons have thought it of importance to investigate carefully the condition of the vesicles. It is now known that pathological changes with reference to these sacs are not rare, and that they are the apparent cause of many obscure symptoms. It will not, therefore, be a matter of surprise if in the near future syphilis is shown to invade these organs.

SYPHILIS OF THE EPIDIDYMIS AND CORD.

The epididymis is rather frequently the seat of secondary syphilitic disturbances. More rarely it is involved in late syphilis, in which case the disease may manifest itself first of all in this part, or the epididymis may be consecutively involved as a result of the extension of the disease from the body proper of the testicle. Dron, of Lyons (Arch. de Méd., 6 ser., tome ii., p. 513), in 1863 first called attention to the presence and frequency of secondary syphilis in the epididymis. In 1872, Tauturri (Il Morgagni, 1872, fasc. 2) and Fournier (Mouvement Méd., Sept., Oct., et Nov., 1874) fully confirmed the statements originally put forward by Dron, and which until then had not been wholly indorsed by the profession. Since this last date numerous observers have called attention to the existence of this condition.

The lesion consists of a rather firm induration in connection generally with the head in contradistinction to the tail of the epididymis (the latter being the chief seat of gonorrhœal involvement). In size the induration commonly corresponds to a bean, rarely reaches the dimensions of a hazelnut, and sometimes only that of a pea. It usually occurs in the third or fourth month of the disease, being contemporary with the general eruption. It is a temporary condition, gradually fading away and leaving no trace, in a similar manner as the corresponding eruption. It oftentimes is bilateral.

To the feel the mass is movable, and not at all attached to the neighboring structures. No pain is liable to be caused by manipulation. In fact, the patient is almost always ignorant of the existence of anything unusual in this part unless his attention is directed to it by the surgeon. Rarely, however, according to Fournier and Balmé (Thèse de Paris, 1876), and since corroborated by a few other observers, this condition is ushered in by so much acute pain and tenderness that the patient has to take to his bed for a short interval. Such symptoms usually soon pass away, leaving the part nonsensitive and painless. There are a few exceptions to the rule that none of the neighboring structures are secondarily involved, as occasionally the testicle proper is slightly tumefied, and sometimes also the cord.

Jullien (Mal. Vénériennes, Paris, 1886) records a case where the adjacent tunica vaginalis participated to such an extent in this induration that a hydrocele resulted. The author resorted to aspiration, expecting to find a tubercular epididymitis. Resolution finally took place in this case promptly as the result of specific medication. The author does not mention the probable interval which had elapsed since inoculation. It was doubtless considerable. I am inclined to consider a condition somewhat corresponding to Jullien's case to be typical of late syphilis originating in

the epididymis. Such also is the opinion of my associate, Dr. Keyes, who first called my attention to the condition about to be described. Keyes has seen six cases. I have seen two, one of them being independent of the six observed by Keyes. The usual history obtainable in one of these cases is much as follows: A man who has considered himself previously in a good state of health has his attention drawn to a swelling apparently in connection with one of his testicles, which is not at all painful, and which for a time generally gives him little concern. It gradually enlarges, however, and may attain the size of an orange or a cocoanut. It then causes trouble and inconvenience from its weight. A surgeon is consulted, who finds that a hydrocele exists. On careful manipulation a rather extensively indurated area is detected behind in the region of the epididymis. The dimensions, however, of this induration are much greater than those of the epididymis, and sometimes the subcutaneous structures of the scrotum may be quite adherent to it. In order to facilitate the examination the fluid contents of the hydrocele are removed by aspiration. This fluid was clear in all cases that I have observed. One can then easily feel the posterior induration, involving the epididymis and extending out from its entire border into the parietal portion of the adjoining tunica vaginalis, resembling somewhat an open oyster shell. The testicle proper is partially involved in case the induration is extensive. In some cases also the cord is thickened to a considerable degree. I have never seen this condition when it was bilateral. In these cases, if appropriate treatment were not resorted to, doubtless the epididymis would be eventually destroyed by gummatous formations.

A. d'Oelsnitz (Thèse de Paris, 1886) and Ozenne (Gaz. Hebdom. de Méd., 1888, 2 ser. xxv, p. 196), both pupils of Reclus, have published articles on syphilitic pachyvaginitis, in which attention is called to a syphilitic process apparently largely, if not wholly, corresponding to the one I have just described as late syphilis involving the epididymis. Ozenne considers that hæmorrhage into the sac of the tunica vaginalis is so common in this condition that he entitles his article Hæmorrhagic Pachyvaginitis of Syphilitic Origin. In this article, which is based largely on that of D'Oelsnitz, he recites six cases to illustrate his ideas: of these, two were taken from the practice of Reclus, three from that of Tédanat, and one from Nélaton. In case I, on drawing off bloody serum, the epididymis, testicle, and tunica vaginalis were all found thickened and infiltrated. In case II there was a double hydrocele. From the right side clear fluid was drawn, showing the epididymis and testicle to be much involved and the tunica to be thickened. From the left side bloody fluid was drawn, showing much the same condition to exist as on the right side, except that the testicle seemed to be more involved. In case III bloody fluid was withdrawn from one side, leaving, however, little

that was apparently wrong to the feel in the neighboring structures. In cases IV and V the epididymes were found involved after bloody fluid had been withdrawn. In case VI the induration radiating from behind was so extensive that fluctuation could only be felt over a small area in front. If the development of these cases had been observed, it would probably have been seen that the epididymis was the structure from which the process originated, and that it was only at quite a late stage that the disease spread sufficiently to involve the parietal layer of the tunica vaginalis.

Apparently hæmorrhage from this inflamed structure is most common, though, strangely enough, I did not encounter it in the cases I have observed. In one of my cases the cord was also involved to a considerable degree, though such a complication was not mentioned in Ozenne's cases. In these cases generally the history of a previous syphilis can be obtained, but, in all, the test that the condition is syphilitic rather than tuberculous (the only other condition that could well be confounded with it) is, that under vigorous and persistent treatment directed to late syphilis the indurations slowly melt and the hydroceles disappear.

True gumma, involving and originating in the epididymis, is rare. Berthole (*Union Méd.*, 1868, p. 57) records a case apparently illustrating this condition, where gummatous material discharged itself from two sinuses connecting with the epididymis.

Of course, in most cases, where late syphilis is determined toward the scrotal contents, the body proper of the testicles is the part involved, the epididymis becoming affected, if at all, by an extension of the disease from the testicles. In these cases of involvement by extension the epididymis usually becomes simply indurated, is but moderately increased in size, and does not throw out, as it were, spurs of induration into the neighboring parietal layers of the tunica vaginalis, as takes place when the corresponding process is primary in the organ.

Late syphilis seems very rarely to attack the *cord* independently of the neighboring or connecting structures. On one occasion, in the case of a gentleman who had contracted syphilis some years previously, I observed the appearance of a painless quite firm tumor, which attained the size of an almond, in connection with the cord of the left side, just outside of the external ring. Under a mixed treatment this soon disappeared. Bert (*Annales de la Polyclin. de Bordeaux*, 1889, vol. i, p. 41) has also observed such syphilitic manifestations, the remaining scrotal structures being apparently free from disease.

Late syphilis of the *testicle proper* is common. Many writers have recorded the results of their observations in this connection, among them Curling, in his classical work on the testicle, so I will not enter into an exhaustive study here of a condition so well known. Virchow considers that late syphilis of the testicle manifests itself by two distinct pathologic-

al processes: (1) sclerosis of the connective tissue; (2) gummatous formations. In the first of these processes the organ early in the attack is moderately enlarged. It is not tender, and causes little inconvenience—sometimes so little, in fact, as not to attract the attention of a phlegmatic individual at all. Oftentimes there is an accompanying hydrocele, which of itself is very noticeable. Still, the element of hydrocele in this condition and in that where gumma exists is not liable to be nearly so prominent as it was in connection with late syphilis of the epididymis, the rather infrequent condition just previously described. This is apparently due to the fact that the visceral layer of the tunica vaginalis usually is so involved in the syphilitic process at an early stage as to form firm adhesions with the parietal layer, thus oftentimes largely obliterating the sac, so that little space finally remains in which to accommodate the effusion which later on has a strong tendency to collect. As time progresses in an attack of this nature, the testicle, which at first was, as has been noted, moderately enlarged, gradually begins to contract as the sclerotic element in reference to the connective tissues asserts itself. This increasing pressure finally serves to destroy the parenchyma of the organ, and atrophy results.

In the second process there is gummatous formation. Here at an early stage the enlargement of the testicle is greater than in the other instance, the size of a goose's egg being frequently attained. The organ is hard and dense to the feel. It is not tender, and, in fact, the ordinary testicular feel is wanting. Commonly the contour of the testicle is regular, though at times it may be nodular, in which instances there usually exist multiple gummatous foci. If now the process is allowed to progress undisturbed, it will be found that over a certain area the scrotal tissues become gradually more and more adherent to the testicle. Then over this area the surface of the scrotum at length presents a red, glazed appearance. Should palpation be resorted to, it will be found that in the center of this red, glazed surface a sensation of commencing softening, and perhaps indistinct fluctuation, can be detected. Shortly after this the area under observation will commence to bulge out. Distinct fluctuation can now be detected, although no pain, tenderness, or heat is found associated.

As a next step the tissues in the middle of this spot break down, giving exit to abundant glazy, gummatous material. After the destructive force of the gumma has spent itself Nature attempts repair. Granulations spring up, but at the same time a contraction sets in in connection with the firm capsule of the testicle, and as the contents of the organ can offer no resistance, owing to the opening left by the gumma, more or less of the parenchyma is crowded out at the opening, covered by the granulations which line the cavity. This condition constitutes the benign

fungus concerning which so much has been written. One does not see this state of affairs very often now, at least in parts of the world adjacent to medical centers, since the process of destruction leading up to this result is so well recognized that the sufferer is put on syphilitic treatment promptly, thus arresting developments. Of course, if this progress goes on to the discharging of the gumma, the testicle is destroyed. Such also is the result even if the gumma does not develop sufficiently to discharge, as atrophic changes set in much as occur in the other sclerotic process which has just been described. One is not, however, apt to see many cases of late syphilis of the testicle where one of these pathological processes exists to the utter seclusion of the other, since commonly, in a given case, there is a blending to a greater or less degree of both. These late lesions of the testicles are quite frequently bilateral.

Differential Diagnosis.—*Secondary syphilis of the epididymis* might be confounded with the induration resulting from a former acute gonorrhœal epididymitis, with tuberculous disease, with a deep-seated cystic formation, and possibly with a commencing malignant disease. A former gonorrhœal epididymitis leaves a small induration in connection with the tail of the epididymis, while secondary syphilis involves the head. Then the remaining gonorrhœal induration is permanent, dating from the acute attack, which is always so painful that it is never forgotten; while on the other hand the syphilitic affection under consideration is only a temporary affair, corresponding to the surface manifestations of that stage.

Commencing tuberculous disease of the epididymis can simulate secondary syphilis of the part. Tuberculous induration is somewhat tender; syphilitic is not. Tubercle generally involves at the same time the prostatic urethra and the cord to the some extent, though it can be primary in the epididymis. This stage of syphilis apparently does not involve these parts, or, if it does, it gives rise to no symptoms. General inspection and the results of treatment will be sufficient to make the diagnosis positive in the event of doubt.

A little cyst of the epididymis might be mistaken for syphilitic induration. Here, however, the absence of general secondary symptoms and the permanence of the cystic lesion under treatment would rule out syphilis. The same reasoning would also apply to commencing malignant disease.

Late syphilis of the epididymis is closely simulated by tubercle; less so by malignant disease and the effects of a traumatism. Many cases of late syphilis of this part are probably confounded with tubercle. The points of difference are, that often the syphilitic affection occurs in men who have no tuberculous antecedents or apparent tendencies. They feel perfectly well with this trouble except for its mechanical inconvenience. The vesical neck is never involved. Often a previous history

of syphilis is obtainable, and last of all the lesion yields to antisyphilitic treatment.

With tubercle the observer generally finds the antecedents of that disease. The lesion is usually more or less painful and tender on manipulation. The newly infiltrated tissue also is liable to break down, forming at first numerous little abscesses, which eventually coalesce into larger ones. When tubercle has progressed so far as to imitate this lesion of syphilis, the cord and vesical wall, as well as the neck of the bladder and prostate, are liable to be involved to a marked degree. Malignant disease of this part when so extensive would probably be painful. It would involve the connecting lymphatics. It would extend itself more symmetrically, attacking all adjacent structures. When one aspirates the hydrocele associated with late syphilis and finds the fluid withdrawn to be bloody, the thought of a hæmatocele might at first be entertained. An hæmatocele, however, is a tumor, which appears very suddenly, as the direct result of some injury. In this condition, also, when the fluid is withdrawn palpation shows no dense effusion surrounding the epididymis.

The only way to decide between late syphilis in connection with the cord and cystic or malignant disease, is to put the patient on treatment directed toward syphilis.

Late syphilis, however, confined to the cord, is so rare that little need be said with reference to its differential diagnosis. Late syphilis of the testicle proper should be distinguished from malignant disease, cystic degeneration, tubercle, and traumatic conditions. Malignant disease is more common in this locality during young life than afterward. It may also, by reason of destructive processes, form a fungus in much the same way as does the syphilitic condition. The disease, which may be quite painful, is liable to be very progressive, especially if the subject is young, involving rapidly the connecting lymphatics, the cord, and adjoining structures generally. It is held in check by no form of medication. Cases have been noted where a malignant process has grafted itself on to a testicle which had previously been damaged by syphilis. Cystic degeneration can rarely give a careful observer much trouble in making a differential diagnosis. Still, if there should be any doubt, a fine aspirating needle would settle it.

Tubercle with reference to the testicle seems always to have reached that part by a process of extension from the epididymis. Even in the most severe instances where the scrotum is riddled by sinuses, and where there is almost complete disorganization of the epididymis and the cord, the testicle proper will still be found quite natural to the feel and but little involved. Acting on this pathological immunity of the testicle, Keyes (see Sarjous's Annual, 1892, article on Genito-Urinary Surgery) in

such conditions removes the epididymis, together with a section of the cord, and leaves the body proper of the testicle with so far uniformly good results. In the case of syphilis the testicle never remains soft and natural to the feel. There is no tendency to suppuration. The testicle proper is primarily involved, except in the rare condition I have considered under the head of the epididymis.

The results of a severe traumatism might, in the absence of all history (a state of affairs which would hardly be presumable), somewhat resemble late syphilis. Still, even then some remaining ecchymosis and bruising could be seen in connection with the scrotum.

Occasionally, in the case of young children who have inherited syphilis, the testicle proper may be attacked in the same manner as has just been described in connection with the late acquired form of the disease.

The effects of syphilis on the testicle and its connections, as regards the reproductive power of the individual, is deserving of a brief consideration. Secondary syphilis, as has been proved by examinations of the semen ejaculated from individuals affected at the time with characteristic lesions of both sides, does not interfere with the passage through the parts and up into the vesicles of spermatozoa. Such, as is well known, is not the case with reference to gonorrhœal involvement of these organs. Late syphilis, of course, owing to the sclerotic changes which ensue, eventually destroys the function of the organ attacked, so that as a result of bilateral involvement the individual becomes sterile.

Bryson, of St. Louis (St. Louis Courier of Medicine, 1882, vii., p. 485), records five cases where men who had had syphilis previous to marriage eventually became sterile after having impregnated their wives in all instances once and in most cases several times during the period shortly succeeding marriage. Finally, no more impregnations taking place, though potency remained, these individuals sought medical advice, and in each instance Bryson found sterility to exist. Nothing wrong could be detected in connection with the testicles, however, except that they were a little more sensitive to the touch and a little less firm in consistency than normal. No treatment benefited these cases. The assumption is made in the article that this state of affairs was due to the preceding syphilis. Whether the lesions causing the sterility were associated with the nervous center or the testicle was not known. In fact, there is no proof offered that syphilis had anything to do with sterility in these cases. Still, one has a right to assume that it may have, owing to its uniform association with the previous history. Perhaps further observation will throw more light on this point.

SYPHILIS OF THE SCROTUM.

There is little that need be said here on syphilis in connection with the scrotum, as this subject has been considered under surface syphilitic manifestations. I will, however, make a few general statements. In most instances secondary lesions in this locality are subject to the action of so much moisture, the source of which is chiefly perspiration, except in uncleanly individuals whose urine is allowed to dribble over the parts, that in the place of being dry they become converted largely into mucous patches. Then to this element of moisture that of friction is added, which, as we have already seen, serves greatly to inflame the plaques. The bases of the sores therefore become infiltrated and raised. In aggravated cases hypertrophic changes set in and condylomata result, just as is the case under like conditions in connection with the foreskin and glans in the male and the external genitals in the female. Late gummata confined to the scrotum may occur very rarely. Commonly, however, when the scrotum is involved with late syphilis the process is one of extension, usually from the testicle proper; rarely from the epididymis, as has already been described.

Gumma primary in the scrotum might be confounded with phagedenic chaneroid, chimney-sweep's cancer, a disease almost exclusively confined to Great Britain, and ulcerative conditions in connection with inflamed sebaceous glands.

THE FEMALE ORGANS.—THE VULVA.

The Initial Lesion.—In the case of the female the study and observation of the initial lesion are accompanied with much more difficulty than is experienced in the case of the male. This is largely due to the fact that the female, unlike the male, does not as a rule seek medical advice until secondary symptoms manifest themselves. The physician then usually makes his positive diagnosis from the general symptoms presented, a special inspection of the vulva being omitted, not only because the diagnosis can be made without it, but also because the patient is often shy, and, in fact, in many cases ignorant of the origin of her existing troubles. The reason for this frequent ignorance on the part of the female as to the source of her subsequent trouble lies in the fact that the initial lesion with her is often small and but slightly indurated, retaining, in fact, through all its phases of development the characteristics simply of the original abrasion. There is also no accompanying soreness or pain, consequently the vulva, owing to its unexposed position, unlike the penis, is not specially inspected, and the chanere passes unnoticed. In the case of the male, the medical observer can in most instances, by watching the development of the penile lesion, fairly accurately foretell from its char-

acteristics the approach of syphilis; but with the female, even when the progress of the sore is carefully noted, there is often little to infer, owing to its slight development beyond the stage of abrasion. Fournier has observed a sore of this description make its appearance, undergo development, and disappear untreated in fourteen days, leaving behind no trace of its existence. R. W. Taylor has seen a similar instance occupying in his case eighteen days. Of course, the same pathological process takes place in these apparently insignificant lesions as has been described elsewhere with reference to the penile chancre. These slight initial lesions are often followed by very severe secondary manifestations.

The reason for this absence of noticeable induration in many cases is probably due to the fact that, owing to the structure of the parts, the surrounding lymph spaces are very spacious, hence the process of engorgement is not so great as to compress the walls of the blood-vessels and thus interfere with the circulation through the part infected. It must not be inferred, however, from what has been said, that with the female the initial sore is always insignificant, for it may take on all the extreme phases of development which we have studied with reference to the penis, even to sloughing and gangrene, as well as a more or less extensive and persistent œdema of the surrounding tissues. This last feature will, however, be considered by itself farther on. Then, again, these sores are not always nonsensitive and painless, as they sometimes give the individual afflicted much discomfort in both these particulars, as well as a persistent itching sensation which leads to extensive friction or scratching, and much consequent inflammatory infiltration of the parts involved.

As in the male, the site of the chancre is determined by the spot where the abrasion takes place. This is usually in connection with the labia majora or minora, together with the sulcus between them. Another frequent site is at the fourchette. Less frequently the vestibule, the clitoris and its prepuce, the free edge represented by the remains of the hymen, and rarely the mons veneris, serve to locate the lesion.

Secondary Syphilis.—These manifestations are at their commencement mucous patches, excepting rarely when squamous lesions appear on the labia majora and the labia minora, in case these last protrude sufficiently to be kept in a state of dryness. Such, however, is not usual, as not only the vaginal and uterine secretions but also the urine serve to moisten them. These mucous patches, unless subject to appropriate treatment, are liable to become inflamed, owing to the continuous moisture and decomposition of the secretions together with the important element of friction. Consequently, the bases of these lesions become infiltrated and elevated, and then, as a further step in the same direction, condylomatous masses sprout from the flat elevations, growing, however, more luxuri-

antly, owing, as has been already mentioned, to the greater amount of friction than is found in connection with the penis. Then, again, there is the element of general œdema, oftentimes of considerable extent, and much the same as occasionally accompanies the initial lesion in this region, which may be associated with these secondary manifestations. Ulceration may take place in the infiltrated and inflamed plaques and become quite a pronounced feature. This process can also attack the condylomatous growths and undermine them in an extensive manner.

Late Syphilitic Manifestations.—Before attempting to consider late manifestations in connection with the vulva, it is well to emphasize the fact in as clear a manner as possible, that until very recently, and to a certain extent still, the pathology of and consequently the differential diagnosis between chronic diseased conditions in this region have been most faulty. This field for study has been largely surrendered to gynecologists, who have followed the teachings laid down in 1849 by Huguier (*Mémoire sur l'Esthiomene, ou dartre rongeante de la région Vulvo-anale*, Paris, 1849), and reiterated by French gynecologists generally, and in England by men able in their line, such as West (*Lectures on Diseases of Women*, fourth edition) and Matthews Duncan (*Edinburgh Med. Jour.*, July, 1884; *Times and Gazette*, November 15, 1884; *Transactions of the Obstetrical Society of London*, vol. xxvii, 1886, pp. 139, 230).

Huguier collected a number of cases, chiefly from a class of women dissolute and careless as regards their person, in which the vulva was usually involved by a brawny general inflammatory infiltration of a low grade associated with ulceration, sometimes very extensive. This condition was called esthiomene, or lupus. I well remember the late Sir Matthews Duncan calling my attention to just such a case in his ward at St. Bartholomew's, which he said was one of lupus of the vulva.

J. N. Hyde, of Chicago (*Jour. Cut. and Genito-Urinary Dis.*, April and May, 1889), and R. W. Taylor, of New York (*New York Med. Jour.*, January 4, 1890, and *American Jour. of the Med. Sciences*, February, 1890), both authorities well versed in syphilis and dermatology, have, however, recently appeared in forcible articles strongly and successfully attacking the old and prevalent ideas handed down by Huguier. In the first place, lupus vulgaris is considered from a dermatological standpoint. It is shown that Hebra and all dermatological writers of note since his time either fail to acknowledge the presence or deny the existence of lupus primarily involving the vulva, it being asserted by Hebra that lupus can involve the vulva only secondarily by a process of extension from the adjoining cutaneous surfaces. In most cases, also, lupus vulgaris shows itself first in childhood, a coincidence very different from what exists in the cases quoted by the followers of Huguier, as illustrative of vulvar lupus. Then, again, the individual ulcers in true lupus

are small and superficial, while in this other condition they are often very extensive, frequently involving the deep structures which go to make up the very foundation of the parts. Microscopical investigations also fail to demonstrate pathological alterations such as one finds associated with lupus.

Hyde, in his article, after successfully excluding lupus as an agent of disease in this quarter, practically abandons the entire field to syphilis, giving to the late stage of this disease the credit—or, perhaps better, the blame—for all the appearances formerly ascribed to lupus. Taylor, however, as a result of great labor, extending over a long period and praiseworthy painstaking in a field generally rather unattractive, as most of his patients were dilapidated old prostitutes consigned to the wards of Charity Hospital, has not only eliminated lupus as Hyde did, but also has shown that several causes aside from syphilis may be held accountable for these chronic vulvar lesions. He, however, admits that syphilis is the agent in many of them. Taylor, in his article, arrives at the following conclusions, which I have thought well to reiterate here in his own words: “(1) That a large and perhaps the greater number of chronic deforming vulvar affections are due to simple hyperplasia of the tissues induced by irritating causes, inflammation, and traumatism; (2) that chronic chaneroid is a cause in a certain proportion of cases; (3) that many cases are due to essential and specific syphilitic infiltrations; (4) that other cases are caused by the hard œdema which often complicates and surrounds the initial sclerosis and perhaps gummatous infiltration; (5) that many cases are due to simple hyperplasia in old syphilitic subjects who suffer from chronic ulcerations of the vulva long after all specific lesions have departed; (6) that some cases also in old syphilitics are due to simple hyperplasia without the existence of any concomitant ulcerative or infiltrative process, and seem to be caused by conditions which usually in healthy persons only result in vulvar inflammation.”

After this digression into the literature of chronic lesions of the vulva, in order to bring the reader's mind into the proper groove, a description of the late lesions of syphilis in this locality can perhaps be the better understood. Sometimes this induration is confined to one or both labia on one side only. Then, again, both sides are involved, in which case they come together like buffers and serve to block the entrance into the vagina. When the tissues constituting the mons veneris are also infiltrated, the parts present an appearance which Hyde has likened to that of a horse-collar. Sometimes this induration asserts itself chiefly in connection with the perineal tissues. This last condition is more usual, however, in those cases where the perinæum has been the seat of injury in years gone by, generally during childbirth.

When induration takes place in the perineal region, it encroaches on

the rectal walls often fully as much as on the vulva, and frequently interferes with the functions of the former organ. If, now, the induration persists during a considerable interval owing to a neglect of proper therapeutic measures, together with constant irritation due to friction and congestion of the parts from much moving about, and often to chronic vaginal discharges or urinary dribblings, the new elements of chronic œdema and hyperplasia are added to that of induration. As a result of this complex condition one expects hypertrophic growths or ulcerations. Often both these latter processes exist in a given instance. The hypertrophies frequently manifest themselves as thick, fleshy, tongue-like projections called by the French *languettes*. At times, however, the hypertrophy, although extensive, is more uniform, producing a condition which has been mistaken for a true elephantiasis.

When in these aggravated conditions the element of hypertrophy is not prominent, that of ulceration usually manifests itself. This ulcerative process may become very extensive. It can, at times when it involves the perinæum, entirely destroy the perineal muscular structure, causing fistulous communications and rarely utter destruction of the tissues between the vulva and rectum. Then, again, it may partially or wholly destroy the labia, or it may extend upward, involving the vestibule and the urinary meatus, at which times the act of urination may become very painful and difficult. I was once called to relieve a woman of retention of urine. Investigation showed an extensive ulceration of this nature to be the cause of her difficulty. Hyde speaks of cases of this nature where the ulceration around the meatus and the adjoining urethra was so extensive and destructive, that the end of the urethra, freed from its support, fell down over the vaginal opening. This destructive process, however (and the same may be said with reference to all late syphilis of the vulva), rarely encroaches upon the vaginal walls, although the cicatrization and contraction subsequent to ulceration may effectually block up the approach to the vagina.

It is well to mention the firm œdema of the vulva which at times is caused by syphilis. This œdema may be associated with the primary sore or with the secondary vulvar lesions. It generally involves the labia majora, although frequently the labia minora are implicated. It is quite persistent, lasting for some time after the associated lesion together with its immediate induration has disappeared as the result of treatment. Taylor claims that in the first, second, and even third years of syphilis occasionally an œdema of these parts occurs as the result of irritation from a chronic discharge, or from some traumatism, although no syphiloma is present; also, that these same irritating causes would not have produced œdema in these cases if the tissue of the vulva had not been affected by the syphilitic process. Of course, in the late syphilitic pro-

esses which have already been considered there is an element of œdema associated with the infiltration and hyperplasia, but as this element in these cases is subordinate to the other two, it has not been thought necessary to emphasize it in that connection.

Differential Diagnosis.—After what has been said regarding the initial lesion when associated with the vulva, it will be seen that oftentimes no definite conclusions can be drawn from the appearances presented, a positive diagnosis only being possible after the development of general secondary symptoms. Otherwise most of the points in differential diagnosis which have already been detailed in considering primary and secondary syphilis of the prepuce and glans penis apply in great measure to like conditions in connection with the vulva, though one must bear in mind the fact that syphilitic condylomata and likewise simple vegetations grow often luxuriantly when grafted on the vulva, and that eventually ulcerative changes, sometimes very extensive, may follow. Ulceration, however, is more frequent in connection with the syphilitic than with the simple hypertrophic condition. Then the element of œdema, often quite prominent, may complicate both primary and secondary lesions in this part. Persisting œdema here, however, is not confined to syphilitic conditions. It may be developed as a result of a traumatism, such as a blow or a kick, as an accompaniment to chancre; also from friction and irritation in connection with any lesion, from a chronic irritating discharge, and from scratching due to pruritus.

Regarding differential diagnosis in connection with late syphilis in this locality, a few special remarks may be added to the more general ones made when considering late syphilis of the mucous membranous portion of the penis. In differentiating between tubercular ulcerations and late syphilis, it is well to bear in mind the fact that tubercular processes are very rare at the vulva, and when they do occur, which is usually in childhood, they are almost always secondary to uterine tuberculosis. Uterine tuberculosis generally proves fatal before the disease extends to the vulva, even in the few cases where the tendency appears to be in that direction. Taylor (*American Jour. of the Med. Sciences*, February, 1890) reports two cases of extensive and progressive ulceration originating at the vulva and afterward spreading to the tissues of the buttocks, thighs, and pubes; in subjects broken down by dissipation. Both these individuals finally died as a result of these extensive lesions. Taylor shows that these ulcerations were simple in character, syphilis and malignancy generally being excluded. It would be impossible, however, in such cases to make a diagnosis excluding late syphilis without a pretty intimate acquaintance with the antecedents of the patient and without histological examinations. Nothing need be said from a differential point of view regarding lupus, after the strong doubt cast on its existence in this locality.

SYPHILIS OF THE VAGINA.

This locality is peculiarly exempt from the manifestations of any stage of syphilis. Fournier states that he never saw a chancre situated beyond the entrance to the vagina. Taylor (*New York Med. Jour.*, January 2, 1892), reports one case of vaginal chancre. Occasionally, where the os uteri is the site of the initial lesion, the process of induration may be so extensive as to involve the adjacent vaginal tissues. Gardillon (*Thèse de Paris*, 1881) has noted at the Lourcine, in the service of Martineau, a number of cases which seem to illustrate this condition. The reason for this peculiar exemption from the initial lesion of the vaginal structures is probably due to the density and toughness of its epithelial layers. The vagina likewise experiences a marked immunity from secondary and tertiary lesions. Secondary lesions, however, which are fairly common in connection with the os uteri, may sometimes, as in the case of primary lesions in the same position, involve to a moderate degree the adjoining vaginal structures by a process of extension. Spillman (*Mém. Soc. Med.*, Nancy, 1881) records a case of late syphilis which involved the vagina. In this instance extensive ulcerations of the part were followed by cicatrization. This is apparently the only case of its kind on record. Gummata may occasionally, when involving parts near by, perforate the vaginal walls in discharging themselves.

SYPHILIS OF THE FEMALE URETHRA.

The initial lesion occasionally involves the meatus, in which position, according to Jullien, it is liable to be associated with much induration and some ulceration. At times the induration extends along the walls of the urethra for some distance, as is seen from time to time in cases where the male meatus is attacked in like manner. A chancre in this position may cause some functional disturbance. The female urethra may possibly be involved in like manner as the male urethra during secondary syphilis, but if such were the case, no subjective symptoms would be aroused to indicate this condition and thus direct special attention to this quarter. It is well known, however, that this part is occasionally attacked by an extension of late vulvar syphilis. Mention has already been made in that connection of the fact that occasionally the tissues serving to support the end of the urethra are destroyed. At such a time the urethral walls are much thickened and indurated. There can also be ulceration at the meatus, which very rarely may extend along the canal. Sometimes in these cases the hard indurated urethral tissues can be felt from the vagina. The caliber of the urethra may be so much occluded by these lesions that retention, more or less complete, may ensue.

SYPHILIS OF THE OS UTERI.

This part is much exposed to inoculation. Naturally the epithelium covering the neck of the womb is very tough, and if it is in a healthy condition at the time of exposure there is very little danger to be feared. It is very common, however, for the part to be eroded and granular, especially in the immediate vicinity of the uterine canal, as a result of endocervicitis, misplacement, former traumatism, etc., under which circumstances the syphilitic virus may easily get a foothold. The chancre in this position passes, as a rule, unnoticed, owing not only to its own indolence, but also to the marked nonsensibility of the parts. On this account the number of instances of chancre of the cervix noted in medical literature is far below what it should be. Schwartz (*Ann. de Derm. et de Syphil.*, tome iv, p. 51) has made some creditable observations of chancre in this position. There seems to be nothing sufficiently characteristic in these initial lesions to allow in many instances a positive diagnosis. As the sore is constantly subjected to the action of moisture, it has a very macerated appearance. The surface is rarely red and granular, but is usually covered by a thin layer of exudative material which can with more or less difficulty be scraped off, leaving a glazy, denuded surface. This film of exudative material is of a gray color, though it may incline somewhat to yellow, and in some cases where the surrounding tissues are very much engorged there may be some surface sloughing in connection with the film, in which instances a greenish tinge may be imparted to the general gray coloring. The film also, where there is more or less sloughing associated with the process of exudation, no longer seems thin, nor can it be scraped off. In the great majority of instances the chancre involves the central portion of the os about the opening of the cervical canal, though rarely it may be eccentric. The amount of induration associated with the sore in this situation is very variable. Often it is slight, and at the same time difficult to estimate, unless the organ be drawn forward by means of a tenaculum where it can be easily felt or pinched between the forefinger and thumb. Occasionally, however, the induration may be so extensive and dense that the whole lower portion of the cervix is hard and gristly, and at the same time very pale. It is in such cases that some surface sloughing may take place.

Secondary syphilitic manifestations on the os uteri are quite common. There is, however, nothing in their appearance oftentimes to differentiate them from the ordinary erosive and superficially ulcerative conditions so common there as the result of chronic diseased conditions of the womb.

A. Martin (*Ann. Derm. et Syphil.*, 1877-'78, p. 399) has described a hypertrophic ulcerative condition of the os which he ascribes to secondary syphilis. His conclusions, however, lack subsequent confirmation, and

can not therefore at present be fully accepted. Late syphilis in connection with this part seems to be very rare, as hardly any mention is made of it in the literature of the subject. Jullien relates having observed a gumma the size of a walnut involving the cervix, at the Lourcine Hospital in the service of Fournier. That this tumor was a gumma was proved by its disappearance under appropriate treatment.

Differential Diagnosis.—Little need be said on the subject of differential diagnosis between syphilitic and other conditions involving this part, since the primary and secondary manifestations usually are so lacking in any special characteristics that a positive diagnosis can only be made in the first instance by awaiting general developments, and in the second by finding other contemporary lesions which confirm those existing on the os. Of course, where any suspicious growth or extensive ulceration involves the cervix, it is well, in the absence of a microscopical examination of a section of the tissue under observation, to make a trial of treatment directed against syphilis. One should bear in mind, also, that chancroids can involve the os. They might be mistaken for primary or secondary syphilis. The soft sore, however, extends more rapidly and more deeply than is usual with syphilis. The parts, also, are actively inflamed and considerably swollen. Besides, the element of auto-inoculation generally asserts itself, the vulva being attacked. Then, too, the painful sensations associated with chancroid when at all extensive are in strong contrast to the negative sensations corresponding to syphilis.

SYPHILIS OF THE BODY OF THE WOMB, THE TUBES, AND THE OVARIES.

Syphilis in connection with these parts is almost unknown in literature, aside from a few random observations which mostly lack authenticity. Gynæcologists apparently almost entirely leave it out of their calculations in the diagnosis of disease in this connection, and pathologists seem to have failed so far to find more than a few stray traces of its existence. Perhaps the ovaries are affected during secondary syphilis in a manner corresponding to the epididymis, but of this there could naturally be very little proof. Oftentimes women during the secondary stage of the disease suffer from functional disturbances in menstruation which are probably largely due to the general *malaise* associated with the early general symptoms; still, they may be in some measure dependent on local manifestations. The ovaries and tubes are rarely the seat of late syphilitic lesions of a gummatous nature. It has been questioned whether some of the sclerotic changes which are observed in connection with the ovarian connective tissues may not at times be due to syphilis, the same as in the testicle. This question has not as yet been settled, though it is very probable that some of these conditions are syphilitic in origin.

Richet (*Traité pratique d'Anatom. Chir.*, fifth edition, p. 701) records a well-authenticated case of gumma of the ovary. Lancereaux also has been quoted to have observed a well-defined tumor of the ovary which disappeared speedily after the introduction of antisyphilitic treatment.

A case of gummatus salpingitis has been put on record by Bouchard and Lépine (*Gomme des Trompes*, *Gaz. Méd. de Paris*, No. 41, 1866). In this case both tubes were involved, and thickened to the diameter of the finger. On exposing them by means of an incision three gummata about the size of a hazelnut were found connected with each tube. The canal was obliterated in each instance. Some time since I was called to treat a young woman of doubtful antecedents who announced that she had a pelvic inflammatory trouble, which was gradually getting worse in spite of the treatment she had received. Bimanual palpation disclosed in the region of the left broad ligament a tumor about the size of an orange moderately tender. As she had already been under the treatment of a good gynecologist without favorable results, I put her on large doses of iodide of potash, although I could not obtain, notwithstanding the many opportunities she had apparently had for contracting the disease, a history of syphilis. The patient began immediately to improve, however, and after a time, the treatment being continued, the tumor gradually disappeared. Although this case does not absolutely prove syphilis of this region, still it justifies one in strongly suspecting that such was the case.

SYPHILIS OF THE PLACENTA has been considered under another heading.

II. SYPHILIS OF THE BLADDER.

This is another organ which is rarely disturbed by syphilitic processes. It may be that the vesical mucous membrane is at times superficially attacked during the secondary stage, but, whether this be so or not, there are no subjective vesical symptoms associated with secondary syphilis. Now that the interior of the bladder can be so easily and accurately explored by means of the cystoscope, it will be a simple matter in the future to definitely settle this question.

The vesical walls are apparently rarely the seat of gummata. Possibly a considerable percentage of the so-called perforating ulcers of the bladder walls are of this nature. Then, again, gummatous processes originating in neighboring organs may, by reason of extension, become at first adherent to the vesical wall, and then later, as the central process of liquefaction and disorganization progresses, break through the walls discharging into the bladder. Under such conditions a fistulous passage persists, connecting the center of the gummatous cavity with the bladder. Proksch (*Vierteljahresschr. f. Dermat. u. Syph.*, Wien, 1879, vi, p. 555) has written an extensive article on the history and pathology of syphilitic



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